DAIKIN

SiEN34-705

R-410A

Service Manual

VRV III®

Design, Installation & Testing Instruction
R-410A Heat Pump 50Hz/60Hz
Cooling Only 50Hz



RXYQ5PY1(E)	RXYQ5PYL(E)	RXQ5PY1
RXYQ8PY1(E)	RXYQ8PYL(E)	RXQ8PY1
RXYQ10PY1(E)	RXYQ10PYL(E)	RXQ10PY1
RXYQ12PY1(E)	RXYQ12PYL(E)	RXQ12PY1
RXYQ14PY1(E)	RXYQ14PYL(E)	RXQ14PY1
RXYQ16PY1(E)	RXYQ16PYL(E)	RXQ16PY1
RXYQ18PY1(E)	RXYQ18PYL(E)	RXQ18PY1
RXYQ20PY1(E)	RXYQ20PYL(E)	RXQ20PY1
RXYQ22PY1(E)	RXYQ22PYL(E)	RXQ22PY1
RXYQ24PY1(E)	RXYQ24PYL(E)	RXQ24PY1
RXYQ26PY1(E)	RXYQ26PYL(E)	RXQ26PY1
RXYQ28PY1(E)	RXYQ28PYL(E)	RXQ28PY1
RXYQ30PY1(E)	RXYQ30PYL(E)	RXQ30PY1
RXYQ32PY1(E)	RXYQ32PYL(E)	RXQ32PY1
RXYQ34PY1(E)	RXYQ34PYL(E)	RXQ34PY1
RXYQ36PY1(E)	RXYQ36PYL(E)	RXQ36PY1
RXYQ38PY1(E)	RXYQ38PYL(E)	RXQ38PY1
RXYQ40PY1(E)	RXYQ40PYL(E)	RXQ40PY1
RXYQ42PY1(E)	RXYQ42PYL(E)	RXQ42PY1
RXYQ44PY1(E)	RXYQ44PYL(E)	RXQ44PY1
RXYQ46PY1(E)	RXYQ46PYL(E)	RXQ46PY1
RXYQ48PY1(E)	RXYQ48PYL(E)	RXQ48PY1
RXYQ50PY1(E)	RXYQ50PYL(E)	RXQ50PY1
RXYQ52PY1(E)	RXYQ52PYL(E)	RXQ52PY1
RXYQ54PY1(E)	RXYQ54PYL(E)	RXQ54PY1

VRV III®

R-410A Series

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Preface

This system is a modular zone controllable air conditioning system of great sophistication which is capable of assembly in a variety of different configurations. It would, however, be no exaggeration to say that the full potential of the systems functions can only be achieved in combination with the skills of those involved in the design of the equipment itself and those responsible for the installation work.

As the move towards intelligent buildings has gathered momentum, so we have also been seeing ever more a growing demand for a wider range of independently controllable building related functions.

Against this background there have also quite naturally been calls for the development of more distributed types of air conditioning systems while at the same time taking full account of the need to use energy economically by demand matching in view of the huge annual increases in the demand for electric power seen in recent years.

We have therefore prepared this installation manual to enable installation work to be handled confidently on the basis of a clear understanding of the special features of this system. We have paid particular attention to points of difference in installation procedure between this system and the more traditional package and room air conditioning system.

The manual is designed specifically to cater for those supervising installation work and concentrates on those products which are currently on the market. Essential points which need to be taken into consideration when designing an appropriate configuration for the system and in each of the separate installation processes have also been included.

We have also added a section covering problems which have arisen in connection with installation work undertaken to date in an attempt to prevent the recurrence of the same problems.

Please be sure to read this manual thoroughly before starting installation work in order to ensure that all such work is carried out with maximum efficiency and to maximum effect.

The following technical documents are also available from Daikin. Please use these documents together with this manual to conduct efficient servicing.

Title	Pub.:No.	Published In
Service Manual VRVIII R-410A Heat Pump 50Hz P Series	Si34-601	Jun., 2006
Service Manual VRVIII R-410A Heat Pump 60Hz P Series	Si34-605	Feb., 2007
Service Manual VRVIII R-410A Cooling Only 50Hz P Series	Si34-704	Mar., 2007

May, 2007

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1. Product Outline

1.1 Model Names of Indoor/Outdoor Units

Indoor Units

Type		Model Name											Power Supply
Ceiling Mounted Cassette Type (Double Flow)	FXCQ	20M	25M	32M	40M	50M	63M	80M	—	125M	—	—	VE
Ceiling Mounted Cassette Type (Multi Flow)	FXFQ	—	25M	32M	40M	50M	63M	80M	100M	125M	—	—	
600×600 Ceiling Mounted Cassette Type	FXZQ	20M	25M	32M	40M	50M	—	—	—	—	—	—	V1
Ceiling Mounted Cassette Corner Type	FXKQ	—	25MA	32MA	40MA	—	63MA	—	—	—	—	—	VE
Slim Ceiling Mounted Duct Type	FXDQ-PVE	20P	25P	32P	—	—	—	—	—	—	—	—	
	FXDQ-PVET	20P	25P	32P	—	—	—	—	—	—	—	—	
	FXDQ-NAVE	20NA	25NA	32NA	40NA	50NA	63NA	—	—	—	—	—	
	FXDQ-NVET	20N	25N	32N	40N	50N	63N	—	—	—	—	—	
Ceiling Mounted Built-In Type	FXSQ	20M	25M	32M	40M	50M	63M	80M	100M	125M	—	—	
Ceiling Mounted Duct Type	FXMQ	—	—	—	40MA	50MA	63MA	80MA	100MA	125MA	200MA	250MA	
Ceiling Suspended Type	FXHQ	—	—	32MA	—	—	63MA	—	100MA	—	—	—	
Wall Mounted Type	FXAQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	
Floor Standing Type	FXLQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	
Concealed Floor Standing Type	FXNQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	
Outdoor Air Processing Unit	FXMQ-MF	—	—	—	—	—	—	—	—	125MF	200MF	250MF	V1
Ceiling Suspended Cassette Type	FXUQ	—	—	—	—	—	—	71MA	100MA	125MA	—	—	
Connection Unit for FXUQ	BEVQ-MA	—	—	—	—	—	—	71MA	100MA	125MA	—	—	VE

Note: FXDQ has following 2 Series, as show below.
FXDQ-P, N(A)VET: without Drain Pump (For General, Asia: except for EU, China and Australia)
FXDQ-P, N(A)VE: with Drain Pump
BEV unit is required for each indoor unit.
MA, NA: RoHS Directive models; Specifications, Dimensions and other functions are not changed compared with M, N type.

Outdoor Units
Normal Series

Series	Model Name									Power Supply
Heat Pump	RX(Y)Q	5P	8P	10P	12P	14P	16P	18P	20P	22P	Y1(E) YL(E)
		24P	26P	28P	30P	32P	34P	36P	38P	40P	
		42P	44P	46P	48P	50P	52P	54P			

Note: There is no YL(E) power supply in Cooling only model.

High COP Series (Energy Saving Series)

Series	Model Name									Power Supply
Heat Pump	RX(Y)Q	16PH	18PH	24PH	26PH	28PH	30PH	32PH	34PH	36PH	Y1(E) YL(E)
		38PH	40PH	42PH	44PH	46PH	48PH	50PH			

Note: There is no YL(E) power supply in Cooling only model.

E : The unit with anti corrosion treatment
VE : 1ϕ, 220~240V, 50Hz, 1ϕ, 220V, 60Hz
V1 : 1ϕ, 220~240V, 50Hz
Y1 : 3ϕ, 380~415V, 50Hz
YL : 3ϕ, 380V, 60Hz

1.2 External Appearance

1.2.1 Indoor Units Heat Pump: 50Hz/60Hz, Cooling Only: 50Hz

Ceiling Mounted Cassette Type (Double Flow)

FXCQ20M
FXCQ25M
FXCQ32M
FXCQ40M
FXCQ50M
FXCQ63M
FXCQ80M
FXCQ125M

Ceiling Suspended Type

FXHQ32MA
FXHQ63MA
FXHQ100MA

Ceiling Mounted Cassette Type (Multi Flow)

FXFQ25M
FXFQ32M
FXFQ40M
FXFQ50M
FXFQ63M
FXFQ80M
FXFQ100M
FXFQ125M

Wall Mounted Type

FXAQ20MA
FXAQ25MA
FXAQ32MA
FXAQ40MA
FXAQ50MA
FXAQ63MA

600×600 Ceiling Mounted Cassette Type (Multi Flow)

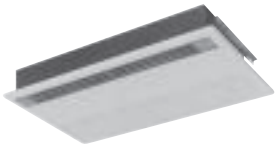
FXZQ20M
FXZQ25M
FXZQ32M
FXZQ40M
FXZQ50M

Floor Standing Type

FXLQ20MA
FXLQ25MA
FXLQ32MA
FXLQ40MA
FXLQ50MA
FXLQ63MA

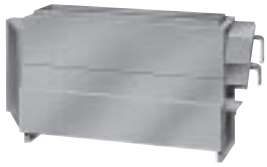
Ceiling Mounted Cassette Corner Type

FXKQ25MA
FXKQ32MA
FXKQ40MA
FXKQ63MA



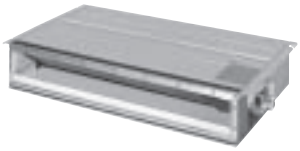
Concealed Floor Standing Type

FXNQ20MA
FXNQ25MA
FXNQ32MA
FXNQ40MA
FXNQ50MA
FXNQ63MA



Slim Ceiling Mounted Duct Type

FXDQ20P FXDQ20N(A)
FXDQ25P FXDQ25N(A)
FXDQ32P FXDQ32N(A)
FXDQ40N(A)
FXDQ50N(A)
FXDQ63N(A)
with Drain Pump (VE)
without Drain Pump (VET)



Ceiling Suspended Cassette Type (Connection Unit Series)

FXUQ71MA + BEVQ71MA
FXUQ100MA + BEVQ100MA
FXUQ125MA + BEVQ125MA

Connection Unit

Ceiling Mounted Built-In Type

FXSQ20M
FXSQ25M
FXSQ32M
FXSQ40M
FXSQ50M
FXSQ63M
FXSQ80M
FXSQ100M
FXSQ125M

Outdoor air processing unit

FXMQ125MF
FXMQ200MF
FXMQ250MF

Ceiling Mounted Duct Type

FXMQ40MA
FXMQ50MA
FXMQ63MA
FXMQ80MA
FXMQ100MA
FXMQ125MA
FXMQ200MA
FXMQ250MA

FXMQ40~125M

FXMQ200 · 250M

1.2.2 Outdoor Units Heat Pump: 50Hz/60Hz, Cooling Only: 50Hz

Normal Series (Space Saving Series)

H/P	RXYQ5P	H/P	RXYQ8P, 10P(12P:EUROPE)	H/P	RXYQ12P, 14P, 16P, 18P
C/O	RXQ5P	C/O	RXQ8P, 10P	C/O	RXQ12P, 14P, 16P,18P
 5HP		 8, 10HP		 12, 14, 16, 18HP	

H/P	RXYQ20P, 22P, 24P, 26P, 28P	H/P	RXYQ30P, 32P, 34P, 36P
C/O	RXQ20P, 22P, 24P, 26P, 28P	C/O	RXQ30P, 32P, 34P, 36P
 20, 22, 24, 26, 28HP		 30, 32, 34, 36HP	

H/P	RXYQ38P, 40P, 42P, 44P, 46P	H/P	RXYQ48P, 50P, 52P, 54P
C/O	RXQ38P, 40P, 42P, 44P, 46P	C/O	RXQ48P, 50P, 52P, 54P
 38, 40, 42, 44, 46HP		 48, 50, 52, 54HP	

High COP Series (Energy Saving Series)

H/P	RXYQ16PH, 18PH	H/P	RXYQ24PH, 26PH
C/O	RXQ16PH, 18PH	C/O	RXQ24PH, 26PH
 16, 18HP		 24, 26HP	
H/P	RXYQ28PH, 30PH	H/P	RXYQ32PH, 34PH
C/O	RXQ28PH, 30PH	C/O	RXQ32PH, 34PH
 28, 30HP		 32, 34HP	
H/P	RXYQ36PH, 38PH, 40PH, 42PH, 44PH, 46PH, 48PH, 50PH		
C/O	RXQ36PH, 38PH, 40PH, 42PH, 44PH, 46PH, 48PH, 50PH		
 36, 38, 40, 42, 44, 46, 48, 50HP			

1.3 Combination of Outdoor Units

Normal Series (Space Saving Series)

System Capacity	Number of units	Module							Outdoor Unit Multi Connection Piping Kit (Option)
		5	8	10	12	14	16	18	
5HP	1	●							—
8HP	1		●						
10HP	1			●					
12HP	1				●				
14HP	1					●			
16HP	1						●		
18HP	1							●	
20HP	2		●		●				BHFP22P100
22HP	2			●	●				
24HP	2		●				●		
26HP	2		●					●	
28HP	2			●				●	
30HP	2				●			●	
32HP	2						●●		
34HP	2						●	●	
36HP	2							●●	
38HP	3		●		●			●	BHFP22P151
40HP	3		●				●●		
42HP	3		●				●	●	
44HP	3		●					●●	
46HP	3			●				●●	
48HP	3				●			●●	
50HP	3					●		●●	
52HP	3						●	●●	
54HP	3							●●●	

Note: For multiple connection of 20HP system or more, an optional Daikin Outdoor Unit Multi Connection Piping Kit is required.

High COP Series (Energy Saving Series)

System Capacity	Number of units	Module						Outdoor Unit Multi Connection Piping Kit (Option)
		8	10	12	14	16	18	
16HP	2	●●						BHFP22P100
18HP	2	●	●					
24HP	3	●●●						BHFP22P151
26HP	3	●●	●					
28HP	3	●●		●				
30HP	3	●	●	●				
32HP	3	●		●●				
34HP	3		●	●●				
36HP	3			●●●				
38HP	3			●●	●			
40HP	3			●●		●		
42HP	3			●●			●	
44HP	3			●		●●		
46HP	3			●		●	●	
48HP	3					●●●		
50HP	3					●●	●	

Note: For multiple connection of 16HP system or more, an optional Daikin Outdoor Unit Multi Connection Piping Kit is required.

Connectable Indoor Unit

Type		Model Name											Power Supply
Ceiling Mounted Cassette Type (Double Flow)	FXCQ	20M	25M	32M	40M	50M	63M	80M	—	125M	—	—	VE
Ceiling Mounted Cassette Type (Multi Flow)	FXFQ	—	25M	32M	40M	50M	63M	80M	100M	125M	—	—	
600×600 Ceiling Mounted Cassette Type (Multi Flow)	FXZQ	20M	25M	32M	40M	50M	—	—	—	—	—	—	V1
Ceiling Mounted Cassette Corner Type	FXKQ	—	25MA	32MA	40MA	—	63MA	—	—	—	—	—	VE
Slim Ceiling Mounted Duct Type	FXDQ-PVE	20P	25P	32P	—	—	—	—	—	—	—	—	
	FXDQ-PVET	20P	25P	32P	—	—	—	—	—	—	—	—	
	FXDQ-NAVE	20NA	25NA	32NA	40NA	50NA	63NA	—	—	—	—	—	
	FXDQ-NVET	20N	25N	32N	40N	50N	63N	—	—	—	—	—	
Ceiling Mounted Built-In Type	FXSQ	20M	25M	32M	40M	50M	63M	80M	100M	125M	—	—	
Ceiling Mounted Duct Type	FXMQ	—	—	—	40MA	50MA	63MA	80MA	100MA	125MA	200MA	250MA	
Ceiling Suspended Type	FXHQ	—	—	32MA	—	—	63MA	—	100MA	—	—	—	
Wall Mounted Type	FXAQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	
Floor Standing Type	FXLQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	
Concealed Floor Standing Type	FXNQ	20MA	25MA	32MA	40MA	50MA	63MA	—	—	—	—	—	

Note: FXDQ has following 2 Series, as shown below.
FXDQ-P, N(A)VET: without Drain Pump (For General, Asia: except for EU, China and Australia)
FXDQ-P, N(A)VE : with Drain Pump
FXZQ : only for EU, Australia

Indoor unit capacity

New refrigerant model code	P20 type	P25 type	P32 type	P40 type	P50 type	P63 type	P80 type	P100 type	P125 type	P200 type	P250 type
Selecting model capacity	2.2 kW	2.8 kW	3.5 kW	4.5 kW	5.6 kW	7.0 kW	9.0 kW	11.2 kW	14.0 kW	22.4 kW	28.0 kW
Equivalent output	0.8HP	1HP	1.25HP	1.6HP	2.0HP	2.5HP	3.2HP	4HP	5HP	8HP	10HP

Use the above tables to determine the capacities of indoor units to be connected. Make sure the total capacity of indoor units connected to each outdoor unit is within the specified value (kW).

- The total capacity of connected indoor units must be within a range of 50 to 130% of the rated capacity of the outdoor unit.
- In some models, it is not possible to connect the maximum number of connectable indoor units. Select models so the total capacity of connected indoor units conforms to the specification.

Differences from Conventional Models

Item	Differences		
	Object	New model (P Model)	Conventional model (MA Model)
Compressor	Connection of equalizer oil pipe	● NONE (No particular changes in terms of service)	● YES
Workability	Equalizer oil pipe for multi-outdoor-unit system	● NONE	● YES
	Procedure for calculating refrigerant refilling quantity	● Refilling quantity due to piping length + Adjustment quantity according to models of outdoor units	● Refilling quantity due to piping length - Adjustment quantity according to models of outdoor units
Optional accessories	Branch pipe for outdoor unit connection	● Y branch Type: BHFP22P100/151	● T branch Type: BHFP22MA90/135

1.4 Model Selection

VRV III Heat Pump: 50Hz/60Hz, Cooling Only: 50Hz

Connectable indoor units number and capacity

Normal Series

HP	5HP	8HP	10HP	12HP	14HP	16HP	18HP
System name	RX(Y)Q5P	RX(Y)Q8P	RX(Y)Q10P	RX(YQ12P	RX(YQ14P	RX(YQ16P	RX(YQ18P
Outdoor unit 1	RX(Y)Q5P	RX(Y)Q8P	RX(Y)Q10P	RX(Y)Q12P	RX(Y)Q14P	RX(Y)Q16P	RX(Y)Q18P
Outdoor unit 2	–	–	–	–	–	–	–
Outdoor unit 3	–	–	–	–	–	–	–
Total number of connectable indoor units	8	13	16	19	23	26	29
Total capacity of connectable indoor units (kW)	7.00~18.20	11.20~29.12	14.00~36.40	16.75~43.55	20.00~52.00	22.40~58.24	25.20~65.52

HP	20HP	22HP	24HP	26HP	28HP	30HP	32HP
System name	RX(Y)Q20P	RX(Y)Q22P	RX(Y)Q24P	RX(Y)Q26P	RX(Y)Q28P	RX(Y)Q30P	RX(Y)Q32P
Outdoor unit 1	RX(Y)Q8P	RX(Y)Q10P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q10P	RX(Y)Q12P	RX(Y)Q16P
Outdoor unit 2	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q16P	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q16P
Outdoor unit 3	–	–	–	–	–	–	–
Total number of connectable indoor units	32	35	39	42	45	48	52
Total capacity of connectable indoor units (kW)	27.95~72.67	30.75~79.95	33.60~87.36	36.40~94.64	39.15~101.79	41.95~109.07	44.70~116.22

HP	34HP	36HP	38HP	40HP	42HP	44HP	46HP
System name	RX(Y)Q34P	RX(Y)Q36P	RX(Y)Q38P	RX(Y)Q40P	RX(Y)Q42P	RX(Y)Q44P	RX(Y)Q46P
Outdoor unit 1	RX(Y)Q16P	RX(Y)Q18P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q10P
Outdoor unit 2	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q12P	RX(Y)Q16P	RX(Y)Q16P	RX(Y)Q18P	RX(Y)Q18P
Outdoor unit 3	–	–	RX(Y)Q18P	RX(Y)Q16P	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P
Total number of connectable indoor units	55	58	61	64			
Total capacity of connectable indoor units (kW)	47.50~123.50	50.25~130.65	53.50~139.10	56.00~145.60	58.00~150.80	61.75~160.55	63.75~165.75

HP	48HP	50HP	52HP	54HP
System name	RX(Y)Q48P	RX(Y)Q50P	RX(Y)Q52P	RX(Y)Q54P
Outdoor unit 1	RX(Y)Q12P	RX(Y)Q14P	RX(Y)Q16P	RX(Y)Q18P
Outdoor unit 2	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P
Outdoor unit 3	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P	RX(Y)Q18P
Total number of connectable indoor units	64			
Total capacity of connectable indoor units (kW)	67.50~175.50	69.50~180.70	71.50~185.90	73.50~191.10

High COP Series (Energy Saving Series)

HP	16HP	18HP
System name	RX(Y)Q16PH	RX(Y)Q18PH
Outdoor unit 1	RX(Y)Q8P	RX(Y)Q8P
Outdoor unit 2	RX(Y)Q8P	RX(Y)Q10P
Outdoor unit 3	–	–
Total number of connectable indoor units	26	29
Total capacity of connectable indoor units (kW)	22.40~58.24	25.20~65.52

HP	24HP	26HP	28HP	30HP	32HP
System name	RX(Y)Q24PH	RX(Y)Q26PH	RX(Y)Q28PH	RX(Y)Q30PH	RX(Y)Q32PH
Outdoor unit 1	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P
Outdoor unit 2	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q8P	RX(Y)Q10P	RX(Y)Q12P
Outdoor unit 3	RX(Y)Q8P	RX(Y)Q10P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P
Total number of connectable indoor units	39	42	45	48	52
Total capacity of connectable indoor units (kW)	33.60~87.36	36.40~94.64	39.15~101.79	41.95~109.07	44.70~116.22

HP	34HP	36HP	38HP	40HP	42HP	44HP	46HP
System name	RX(Y)Q34PH	RX(Y)Q36PH	RX(Y)Q38PH	RX(Y)Q40PH	RX(Y)Q42PH	RX(Y)Q44PH	RX(Y)Q46PH
Outdoor unit 1	RX(Y)Q10P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P
Outdoor unit 2	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q16P	RX(Y)Q16P
Outdoor unit 3	RX(Y)Q12P	RX(Y)Q12P	RX(Y)Q14P	RX(Y)Q16P	RX(Y)Q18P	RX(Y)Q16P	RX(Y)Q18P
Total number of connectable indoor units	55	58	61	64			
Total capacity of connectable indoor units (kW)	47.50~123.50	50.25~130.65	53.50~139.10	56.00~145.60	58.00~150.80	61.75~160.55	63.75~165.75

HP	48HP	50HP
System name	RX(Y)Q48PH	RX(Y)Q50PH
Outdoor unit 1	RX(Y)Q16P	RX(Y)Q16P
Outdoor unit 2	RX(Y)Q16P	RX(Y)Q16P
Outdoor unit 3	RX(Y)Q16P	RX(Y)Q18P
Total number of connectable indoor units	64	
Total capacity of connectable indoor units (kW)	67.50~175.50	69.50~180.70

2. Points to Bear in Mind at the System Design

2.1 Points Relating to the Performance of the Air Conditioning Units

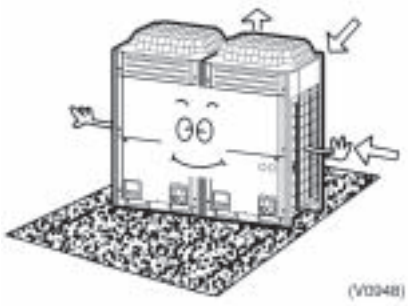
A number of points need to be borne in mind at the system design stage in order to ensure the mechanical efficiency of the air conditioning units.

1. **Path of refrigerant piping between outdoor and indoor units, height difference and pipe length.**

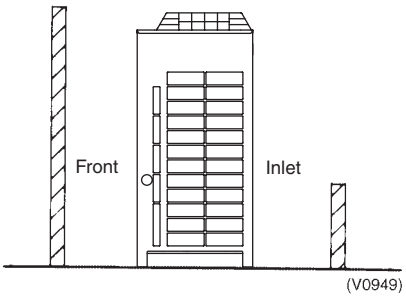
- Path of refrigerant piping should be determined such that length of piping is kept to a minimum.
- Piping should be kept within permissible limits in terms of length and height difference.

2. **Positioning of outdoor unit**

- Position such that maintenance and repairs can be carried out. (leave room for servicing)
- Avoid reduction of airflow and short circuiting

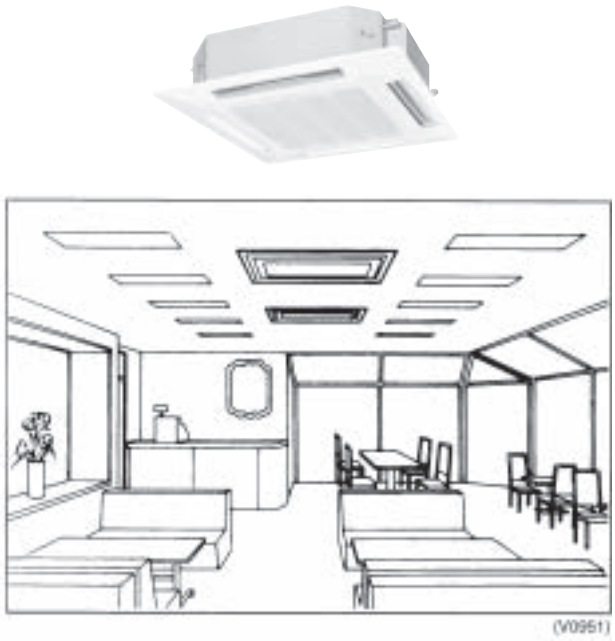


- Avoid reduction of airflow and short circuiting



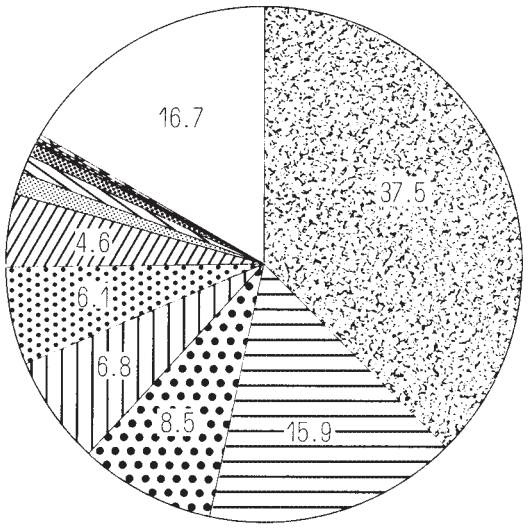
3. Positioning of indoor unit

- Position such that maintenance and repairs can be carried out. (inspection port positions and size check)
- Avoid short circuiting
- Ensure sufficient drain pipe gradient (need for drain-up kit etc.)
- In the case of a ceiling mounted type make sure ceiling depth is sufficient (need for high performance filter, etc.)



2.2 The Installation is of Vital Importance

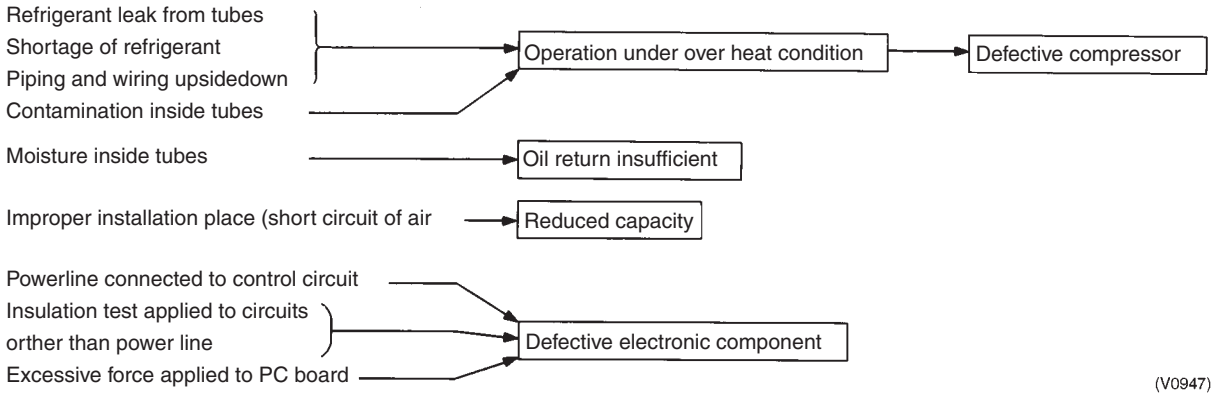
The analysis of major installation problems experienced is shown below;



Wrong interconnection wiring	37.5%
Wrong setting of switches	15.9%
Wrong power line wiring	8.5%
Improper field piping	6.8%
Improper drain piping	6.1%
Refrigerant leak from FLARE	4.8%
Improper model selection	1.4%
Refrigerant leak from BRAZING	1.1%
Improper installation place	0.9%
Improper power supply voltage	0.3%
Defective insulation work	0.2%
Improper technical information	0.2%
Miscellaneous	16.9%

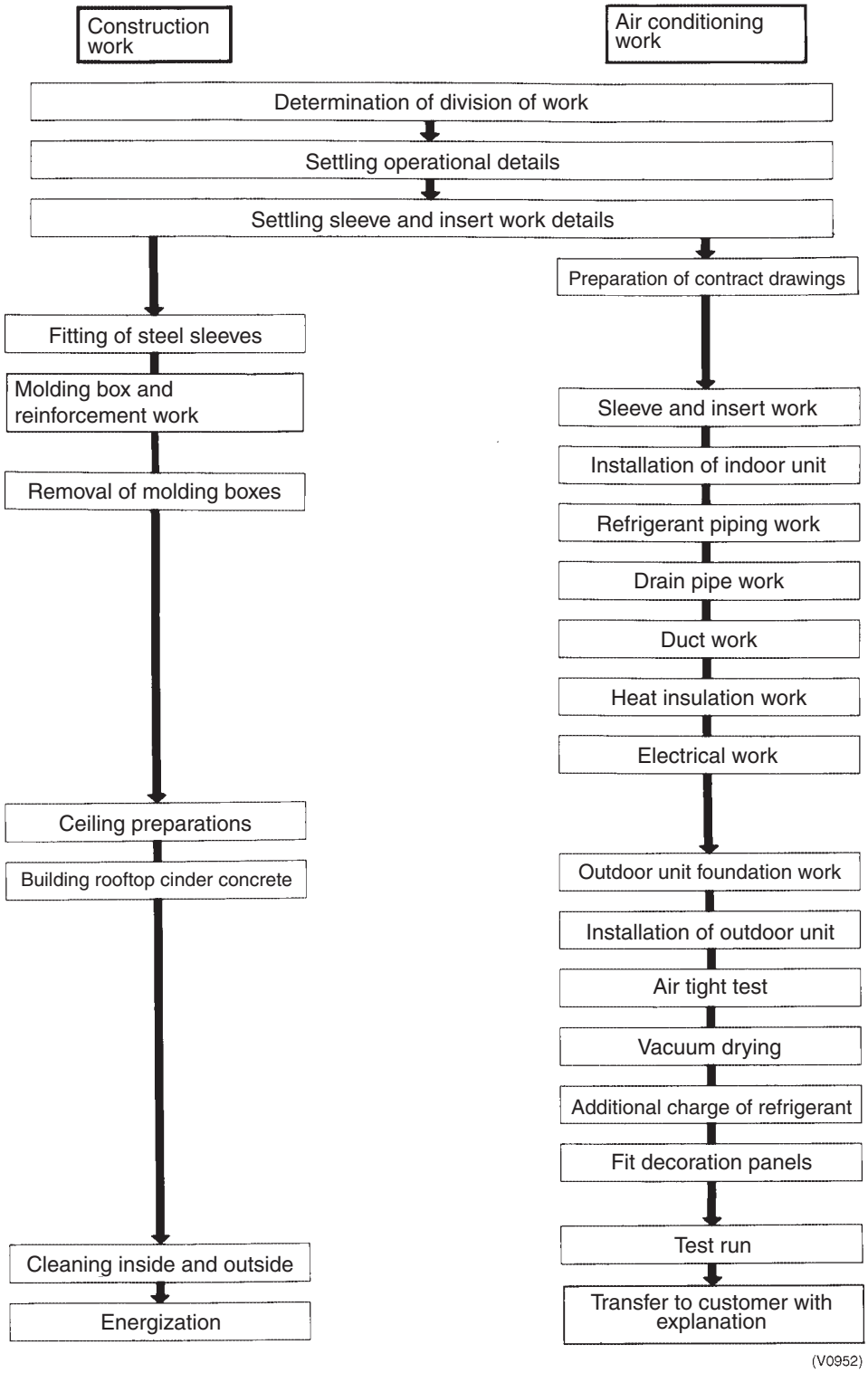
(V1147)

How these installation problems affect an equipment are shown below:



(V0947)

2.3 Striking a Balance between System Installation and General Construction Work (Comprehensive Flow Chart)



Note:

1. The division of the work should be thoroughly clarified. (This applies particularly to work relating to the connection of control wiring, fitting of remote control and central control panel, boundary work on areas such as connection of drain piping and humidification supply piping, inspection and foundation)
2. Keep a constant check on the progress of the construction work to avoid deviations from the air conditioning work schedule.
3. For sleeve and insert work the positions of ceiling girders should be confirmed and sleeve and insert requirement, hole diameters, positioning and numbers decided. This is particularly important in the case of sleeves for drain piping.

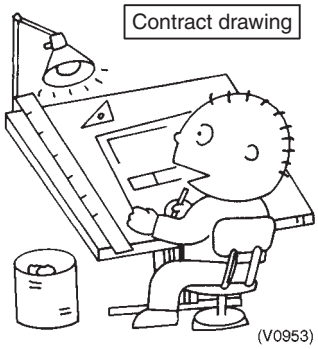
2.4 Points to Bear in Mind when Preparing the Contract Drawings

The following points should be borne in mind when preparing the contract drawings from the original drawings and the execution drawings.
The contract drawings for the air conditioning system are blueprints for the performance of the necessary work which are drawn up on the basis of the original drawings in such a way that a working balance is achieved between the specific requirements of each individual aspect of the work.

Contract Drawing

Objectives include:

- The drawings should be easily comprehensible to those carrying out the work.
- The contents of the drawings should not be subject to subsequent alteration.

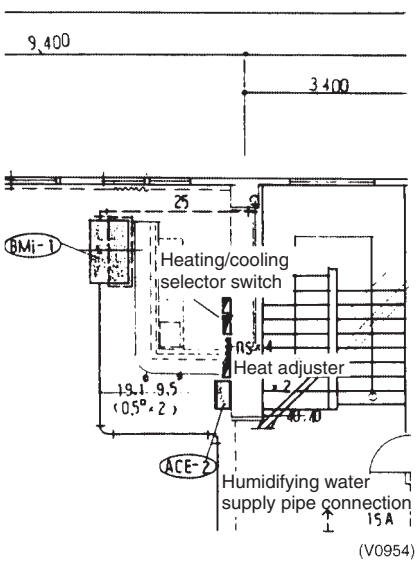


The following is a list of the main points to be considered when preparing contract drawings for the VRV III System and should be used as a reference during this stage of the work:

2.4.1 At the Contract Drawing Stage the Following Points are Critical!!

	Check points
Arrangement of units	1. Have you left the access passages clear and allowed sufficient room for servicing? 2. Have you taken full account of the possibility of short circuits? (Both indoor and outdoor units) 3. Can the air filters be replaced easily? 4. Have you indicated the size and location of the ceiling inspection ports? (Make sure there no other installations in the area above) 5. Have you taken into account the depth of the installation area? (In case of ceiling built-in type) 6. Have you specified the position of the indoor unit clearly? (Have you taken full account of relevant features of the local ventilation, humidity and lighting?)
Refrigerant piping	1. Is the piping system correctly connected? 2. Are the rise and fall pipes correctly connected? 3. Are the lengths and height differences of the pipes within the recommended limits?
Operational control	1. Are the interconnections between the piping and wiring of the indoor and outdoor units clearly shown? 2. Are the numbers of the local setting switches clearly shown? (Group No. and Unit No.) 3. Are the wiring connections between the remote control and the centralized and remote controls clearly shown? **Refer to the notes relating to the preparation of the control wiring system diagrams (see next page)** 4. Are the different types of wires clearly marked? 5. Are the any problems with the way the power supply cables and control wiring have been separated or bound together? 6. Are the inter-floor connections of the control wiring correct? 7. Is the position of the remote control clearly marked?
Miscellaneous	1. Have you checked the gradient of the drain piping? (Must be at least 1/100)

(Example of a contract drawing)



2.4.2 Main Considerations in Preparation of Control Circuit Diagrams

In addition to the design of the appropriate this system configuration it is also essential that the control system be made amply clear. If the system is designed and installed without a clear, comprehensive plan then problems are inevitably going to occur during the test run.
Servicing too will become much more time consuming than necessary. However, if control circuit diagrams are prepared along with the contract drawings in order to make the total system clearly visible then the essential points relating to the electrical connections will be easily understood, the test run will go off without a hitch and the whole system will be rendered fully effective.

Step 1: Compiling a System List

1. Mark each outdoor unit with a code.
2. Add field settings and data for outdoor units, and outdoor unit No. if using sequential start.
3. Add the model number of each indoor unit connected to each refrigerant circuit.
4. Assign each indoor unit a code.
5. Fill in the location of each indoor unit.
6. Group indoor units controlled by one or two remote controls. (group or individual control).
7. Assign central group Nos. if using centralized control.
8. Add field settings and optional equipment for indoor units.
9. Add unit No. if making separate field settings for each indoor unit under group control.

Note: With the VRV III R-410A Heat Pump, Cooling Only Series, unit No. is determined through automatic addressing, therefore readout unit Nos. after activating the power.

Example: System list

Outdoor Unit		Indoor Unit						
Model Name (code)	Field Settings	Model Name	System Name	Location	Remote Control Group	Centralized Control Group No.	Unit No.	Optional equipment, field settings, etc.
RX(Y)Q16P (PAC1)	Cool/Heat selector: Indoor unit Low noise operation (L.N.O.P): Individual control Sequential start: ON Defrost: Earlier Sequential start No.	FXCQ32M	2F01	2nd floor office	A	1–00		
		FXSQ63M	2F02	2nd floor office	A	(1–00)		
		FXCQ40M	2F03	2nd floor office	A	(1–00)		
		FXHQ63MA	2F04	2nd floor office	B	1–01		
		FXCQ50M	2F05	2nd floor office	B	(1–01)		
RX(Y)Q18P (PAC2)	Cool/Heat selector: Indoor unit Low noise operation (L.N.O.P): Individual control Sequential start: ON Defrost: Earlier	FXSQ32M	3F01	3rd floor office	C	1–02		
		FXCQ40M	3F02	3rd floor office	C	(1–02)		
		FXSQ40M	3F03	3nd floor office	C	(1–02)		
		FXCQ50M	3F04	3rd floor office	D	1–03		

For details on field settings and centralized control group No., refer to the installation manual and system reference materials.

Step 2: Preparation of the Control Circuit Diagrams

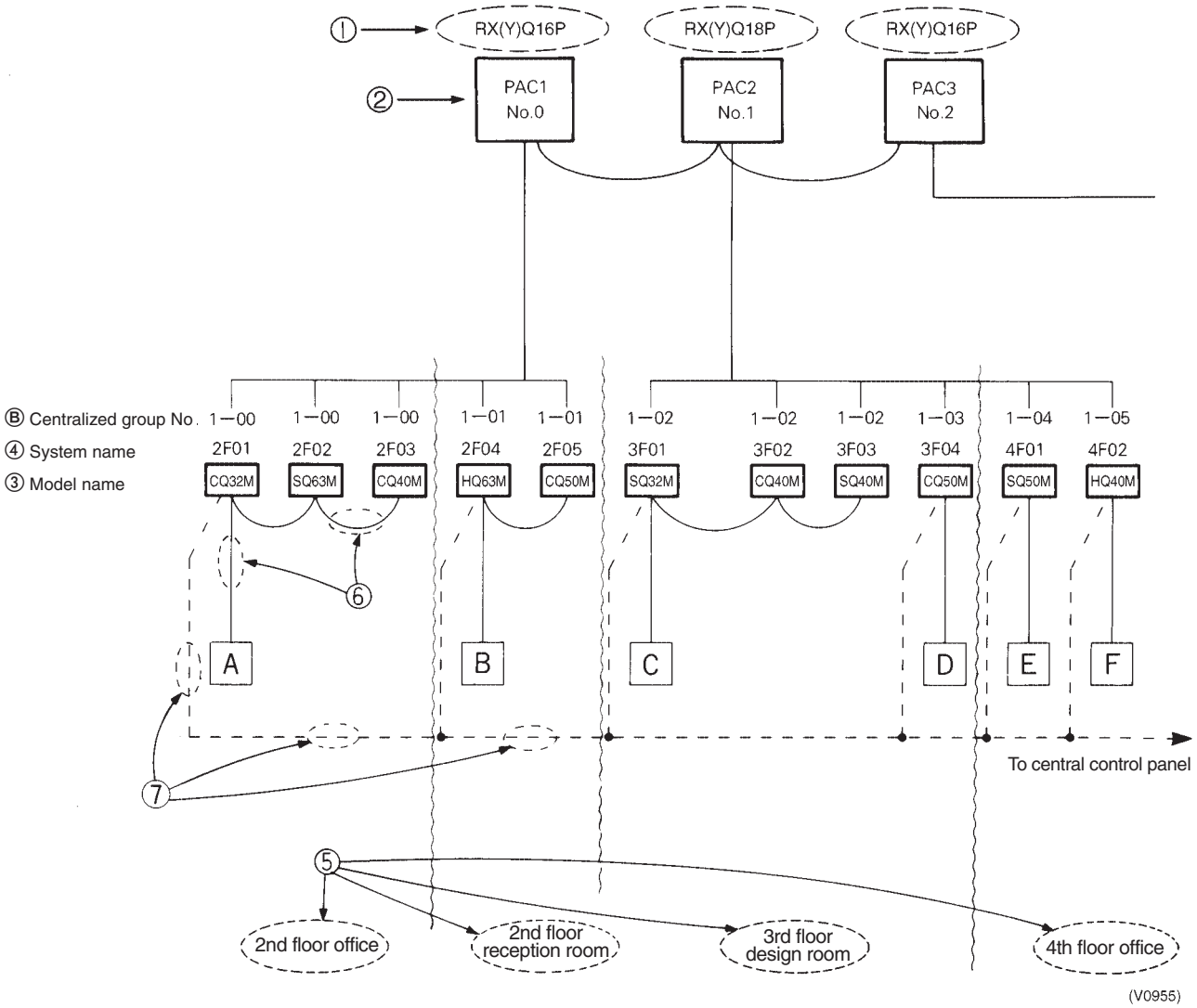
The following sequence should be followed in order to prepare control circuit diagrams in accordance with the system list which has already been completed:

① Diagrams should be prepared for each individual outdoor unit. The outdoor unit model number should be inserted into the diagram. (RX(Y)Q16P)
② Insert name of refrigerant system. (PAC1, PAC2)
③ Insert name of indoor unit. (FXCQ32M→CQ32M)
④ Insert system name of indoor unit.
⑤ Insert installation position. (Do this when demarcation is possible)
⑥ Insert remote control control wiring. (Group) Indicated by solid line. .....Solid line.
⑦ Insert centralized control wiring. .....Dotted line
⑧ Insert Group No. (G No. for each indoor unit with U No. 0)

The control circuit diagrams are now complete.

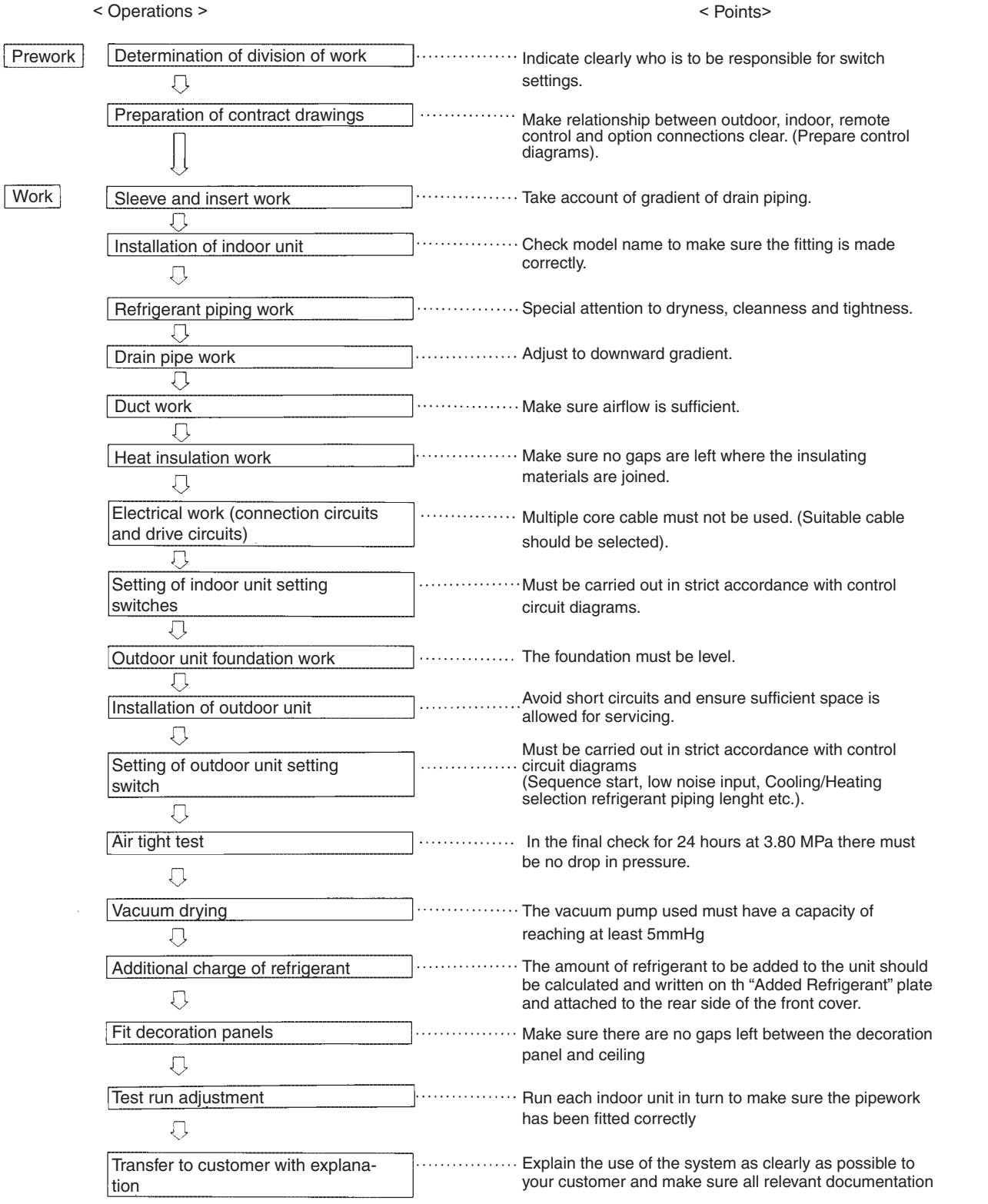
Example: Control circuit diagram

Example: Control circuit diagram



3. Installation

3.1 Step by Step Installation Procedure



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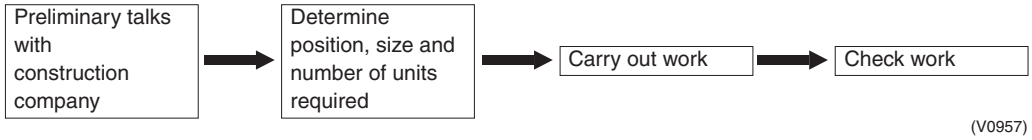
The above list indicates the order in which the individual work operations are normally carried out but this order may be varied where local conditions warrant such a change

3.2 Work Involved in Individual Operations and Points to be Borne in Mind

3.2.1 Sleeve and Insert Work

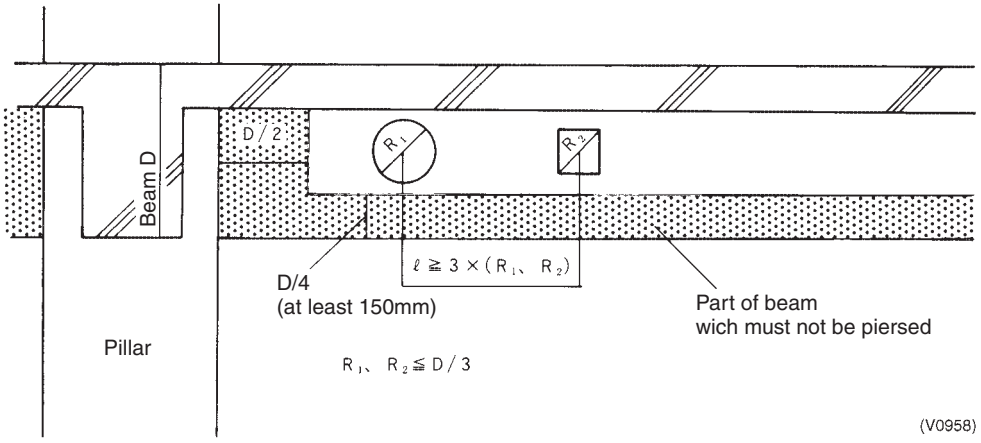
■ **Operational steps**



Positioning of the Pipe Holes

a) The through holes for the drain piping should be positioned such that the pipes have a downward gradient. (The gradient must be at least 1/100. The thickness of the insulating materials must also be taken into consideration.)
b) The diameter of the through holes for the refrigerant piping should include an allowance for the thickness of the heat insulation materials. (It is a good idea to think of the liquid and gas pipes as pairs.)
c) Attention should be paid to the construction of the beam themselves since there are sometimes parts of the beam which cannot be used to accommodate through holes.

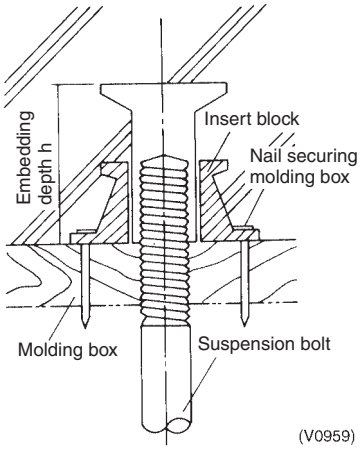
Example: Through holes in a reinforced concrete beam



Positioning the Insert

a) An insert is a metal tool which is inserted into a floor or a beam before the concrete is set such that fittings such as ducts, pipes or suspension bolts for hanging units can be fitted into place later. **The positions of the inserts must be decided early.**

Example: Steel insert

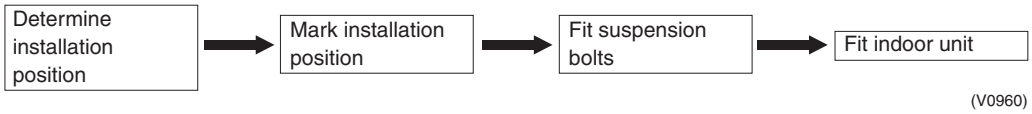


Important point:

1. The weight of the fitting to be suspended must be taken into account when choosing the insert.

3.2.2 Installation of Indoor Unit

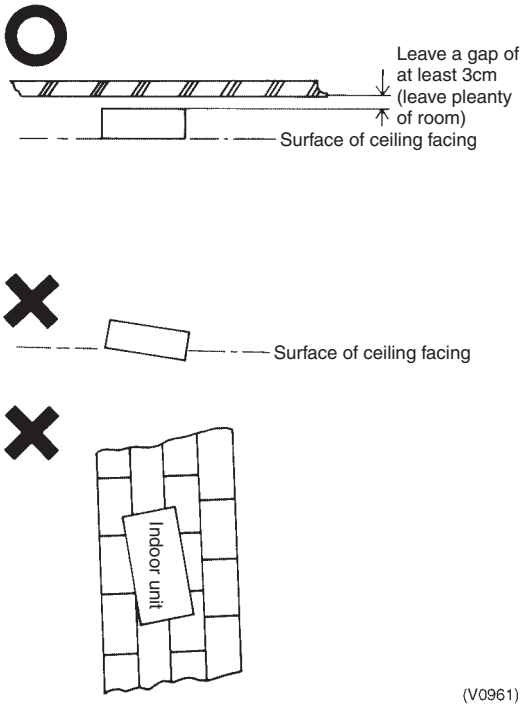
■ **Operational steps**



Positioning

3 essential points when installing an indoor unit

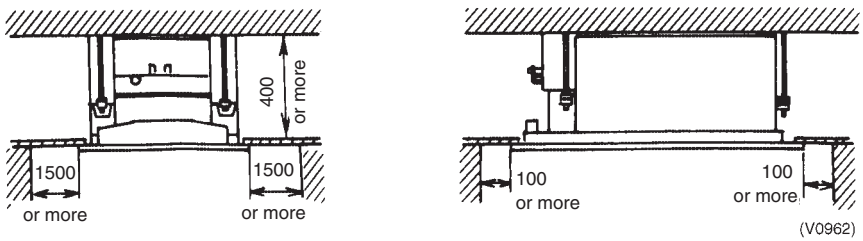
1. Height: Take care to account for final ceiling facing surface level
2. Level: Level fitting is essential. (within ±1 degree of horizontal)
3. Direction: The unit must be fitted in line with the ultimately visible ceiling joints



Important points

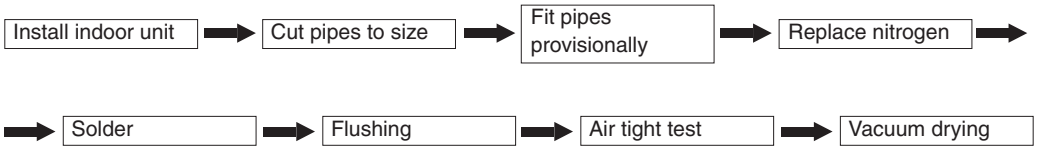
1. The suspension bolts must be strong enough to support the weight of the indoor unit.
2. Optional features must be added to the indoor unit prior to installation.
3. The model name should be checked prior to installation.
4. Take care to align the main unit correctly. (Bearing in mind piping layout and direction of blow out)
5. Leave sufficient space for servicing to be carried out.
6. Make inspection holes for model which need them.
7. Fit the unit to ensure proper drainage.

Example: Ceiling mounted cassette type (FXCQ63M)



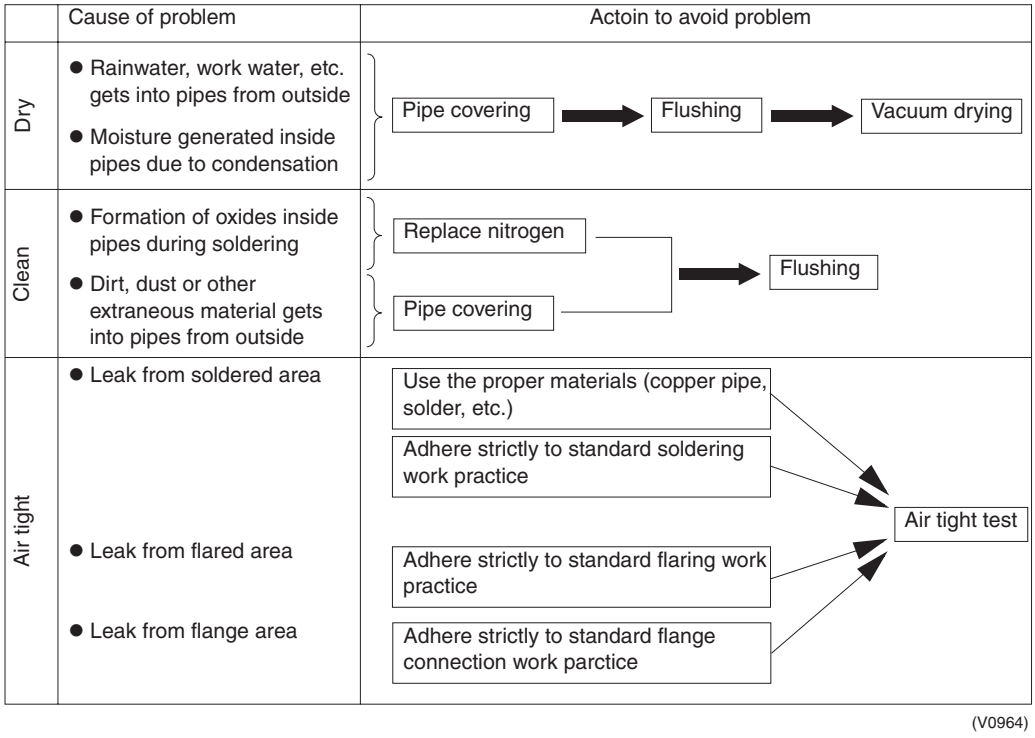
3.2.3 Refrigerant Pipe Work

■ **Operational steps**

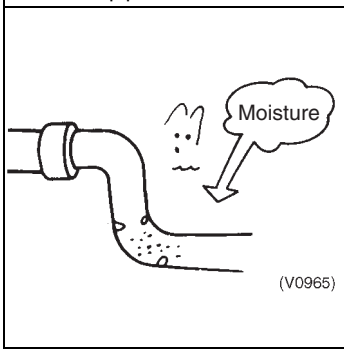
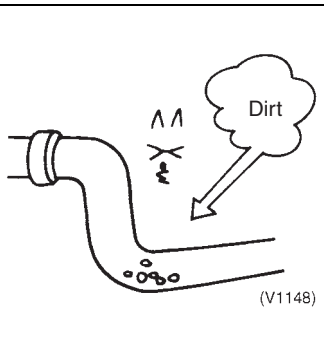
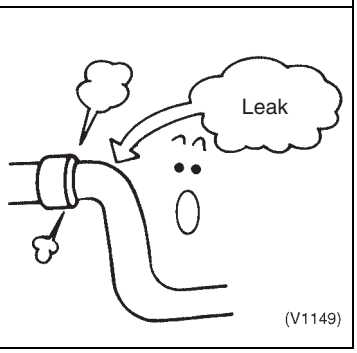


The 3 Principles of Refrigerant Piping

The “3 principles of refrigerant piping” must be strictly observed



The 3 principles of refrigerant piping

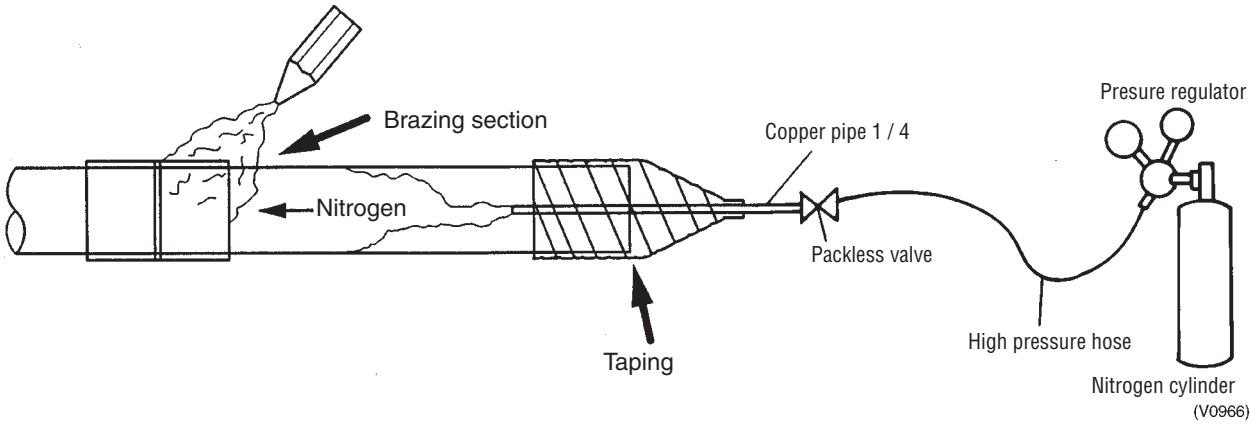
Dry	Clean	Air tight
Make sure there is no moisture inside the pipes	Make sure there is no dirt inside the pipe	Make sure the refrigerant does not leak out
		

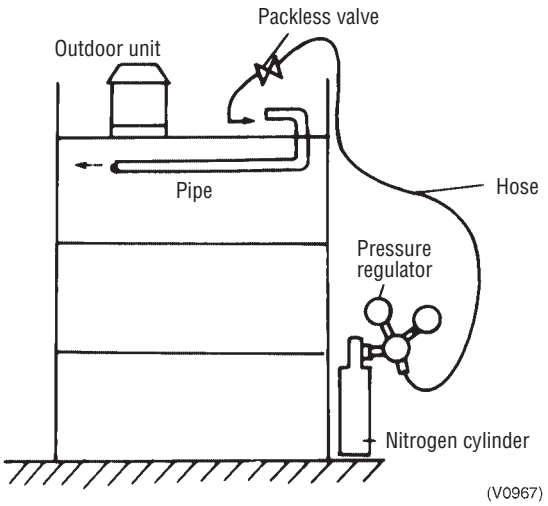
Method for Replacing Nitrogen (Brazing)

If brazing work is carried out without passing nitrogen gas through the pipes which are being brazed then this allows the formation of oxidation bubbles on the inside surface of the pipes. These oxidation bubbles are then carried along inside the pipes to cause damage to various members of the system such as valves or compressors and the system ceases to function properly.

In order to avoid this problem **nitrogen is passed through the pipes while the soldering work is being carried out**. This operation is known as nitrogen replacement. (Air is replaced by nitrogen)

This is **standard work practice for all brazing work**.





Important points:

1. The gas used must be nitrogen (oxygen, carbon dioxide and flon should not be used.)
2. A pressure regulator must be used.

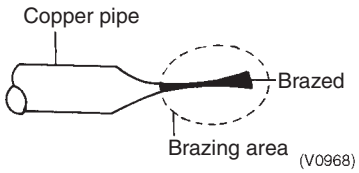
Covering of Refrigerant Pipes

Covering is an extremely important operation as it prevents water, dirt or dust from getting inside the pipes. Moisture inside the pipes was a constant source of trouble in the past. The utmost care is required to nip this problem in the bud.

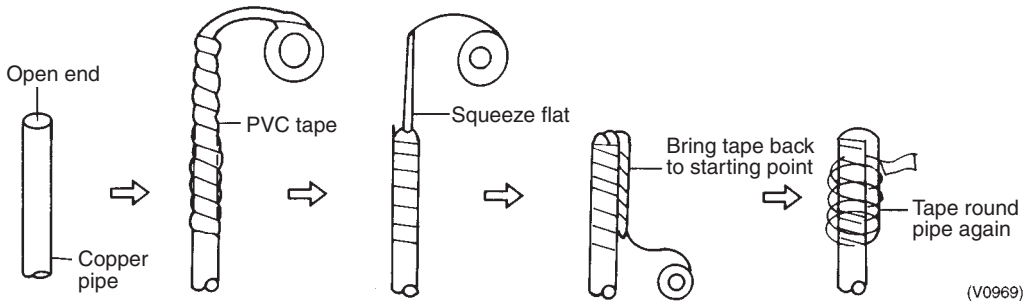
The end of each pieces of pipe must be covered. “Pinching” is the most effective method but “taping” is an simple alternative which may be used according to the work area and term of work.

Location	Term of Work	Covering Method
Outdoors	1 months or more	Pinching
	Less than 1 months	Pinching or taping
Indoors	Irrelevant	Pinching or taping

1. Pinching method
   The end of the copper pipe is squeezed together and the gap brazed.
2. Taping method
   The end of the copper pipe is covered with PVC tape (vinyl tape).

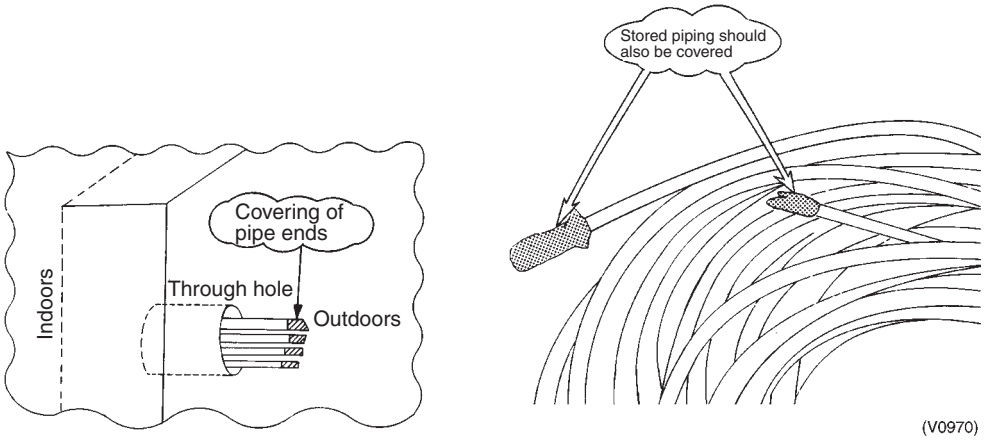


<Taping method>



Particular care should be taken during the following operations:

- When passing copper pipe through a penetration hole (Dirt easily gets into the pipe).
- When copper pipe is located outside (Rainwater gets in)
  (Special care is needed when the pipes are standing vertically outside).



Refrigerant Pipe Flushing

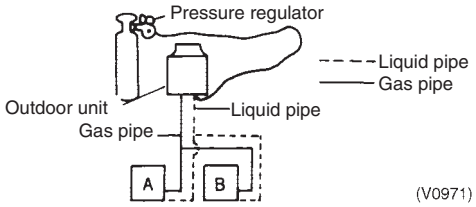
Flushing is a method of cleaning extraneous matter out of pipes using pressurized gas.

[3 major effects]

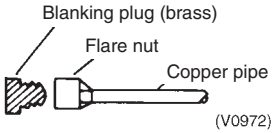
1. Removal of oxidation bubbles formed inside copper pipes when “nitrogen replacement is insufficient” during soldering work
2. Removal of extraneous material and moisture from pipes when covering has been insufficient
3. Checks connections in pipes linking outdoor and indoor units (Both liquid and gas pipes)

[Example of procedure]

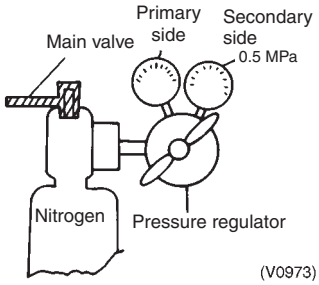
1. Set pressure regulator on nitrogen cylinder.
   ∗The gas used must be nitrogen.
   (There is a danger of condensation if fleon or carbon dioxide are used and oxygen carries the risk of explosions.)



2. Connect the charge hose from the pressure regulator to the service port on the liquid pipe side of the outdoor unit.
3. Fit blanking plugs to all indoor units (B) other than unit A.

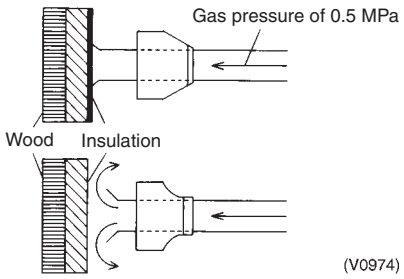


4. Open the main valve on the nitrogen cylinder and set the pressure regulator to 0.5MPa.



5. Check that the nitrogen is passing through the unit A liquid pipe.
6. Flushing.

■ Block the end of the pipe with the insulation of your hand.
↓
■ When the gas pressure becomes too great to contain remove insulation quickly. (First flush)
↓
■ Block the end of the pipe with insulation again.
↓
(Carry out second flushing)



(The nature and amount of the extraneous material inside the pipe can be checked during flushing by placing a rag lightly over the end of the pipe. In the unlikely case that even a small quantity of moisture is found then the inside of the pipe should be dried out thoroughly.)
Action:

1. Flush the inside of the pipe with nitrogen gas. (Until such time as the moisture disappears.)
2. Carry out a thorough vacuum drying operation. (See page 39)
   ① Close the main valve on the nitrogen cylinder.
   ② Repeat the above operation for unit B.
   ③ When the liquid pipe operations have been completed then do the same with the gas pipes.

Choice of Materials for Refrigerant Piping

a) Refrigerant piping

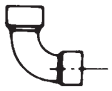
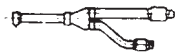
Selection of piping material

1. Foreign materials inside pipes (including oils for fabrication) must be 30mg/10m or less.
2. Use the following material specification for refrigerant pipping:
   - construction material: Phosphoric acid deoxidized seamless copper for refrigerant.
   - size: Determine the proper size referring to chapter “Example of connection”.
   - The wall thickness of the refrigerant piping should comply with relevant local and national regulations.
     For R-410A the design pressure is 4.0 MPa.(40.8kgf/cm^2).
3. Make sure to use the particular branches of piping that have been selected referring to chapter “Example of connection”.
4. The piping minimum thickness and material.
   * The min. thickness of the pipes shows the requirements of Japanese High Pressure Gas Control low. (As of Jan. 2003)
     And the temper grade (○, 1/2H) shows the material type of JIS H 3300.
     The thickness and material should comply with relevant local and national regulations for the design pressure 4.0MPa (40bar).
     Select the wall thickness in accordance with relevant local and national regulations.

	R-410A	
Size	Temper grade	Minimum thickness (mm)
ϕ6.4	○	0.80
ϕ9.5	○	0.80
ϕ12.7	○	0.80
ϕ15.9	○	0.99
ϕ19.1	1/2H	0.80
ϕ22.2	1/2H	0.80
ϕ25.4	1/2H	0.88
ϕ28.6	1/2H	0.99
ϕ31.8	1/2H	1.10
ϕ34.9	1/2H	1.21
ϕ38.1	1/2H	1.32
ϕ41.3	1/2H	1.43

Equivalent piping length of joints and header (Reference)

(Unit: mm)

Pipe Size	ϕ6.4	ϕ9.5	ϕ12.7	ϕ15.9	ϕ19.1	ϕ25.4	ϕ31.8	ϕ34.9	ϕ38.1	ϕ41.3
L Joints 	0.16	0.18	0.20	0.25	0.35	0.45	0.55	0.60	0.65	0.75
REFNET Joint 	0.5									
REFNET Header 	1.0									

b) Brazed joints and special branches

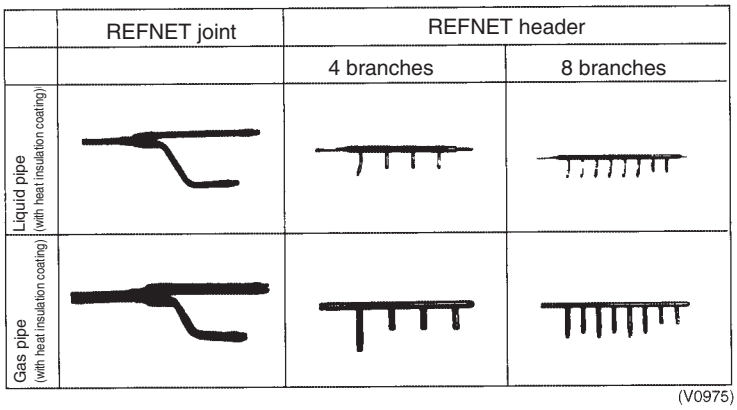
1. General use (L bend joint, socket joint, T joint, etc.)

- Joints must meet the requirements of the relevant JIS standard. (Size, materials, thickness, etc.)

2. Special branches

- The Daikin outdoor unit multi connection kit, REFNET joint, REFNET header or Reducing socket should be used.

Example: R-410A RXYQ-P Series



Refer detail of DAIKIN REFNET joint and REFNET header on page 161.

c) Brazing

The Multi-System requires only copper/copper jointing and the jointing method is explained below.

- The use of “hard solder” is essential.

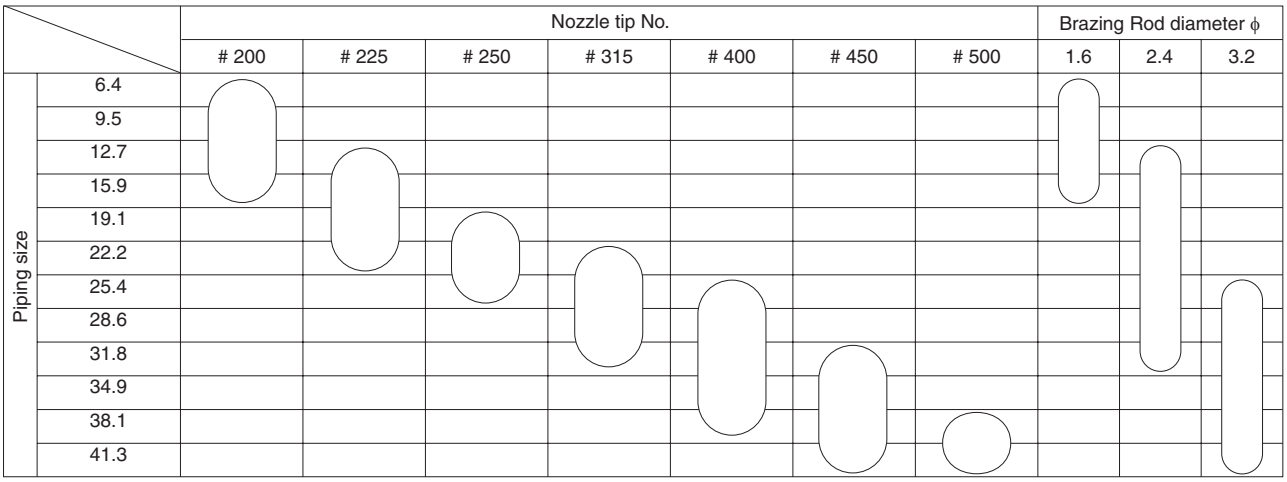
Type	Solder: JIS mark	Soldering: temperature (°C)	Breaking strengh (kg/mm²)	Soldering method	Jointing distance (mm)	Example for reference (product name)	Flux (example for reference)	Remarks
Hard solder	BCup-2 (Phospor copper solder	735 ~ 840	Approx. 25	Gas	0.05 ~ 0.2	NEiS # 2BD	Not required	BCup-2 reacts easily with slufur to form a fragile water-soluble compound and should not therefore be used where the environment is not suitable.
	BAg-2 (Silver solder)	700 ~ 845	Approx. 25	Gas	0.05 ~ 0.2	NEiS # 107	NEiS # 103	Suitable for environments with a high sulfur content

This is used under normal conditions

(V0976)

The R-410A Heat Pump, Cooling Only RX(Y)Q-P Series uses a wide range of piping sizes. You should therefore be careful when selecting the nozzle tip. If a small nozzle tip is used for brazing piping of large diameters such as ϕ38.1 and ϕ44.5, brazing flow becomes poor.

Table 1: Correlation of nozzle tip and size of refrigeration piping

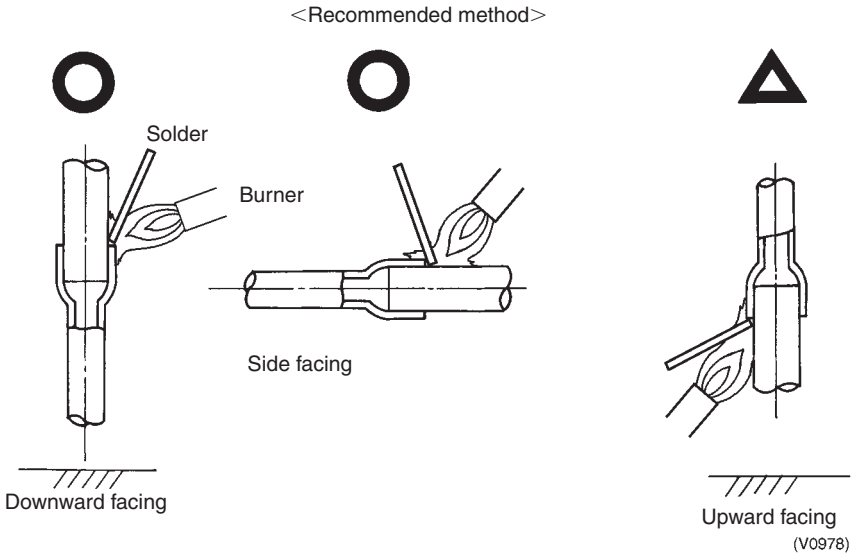


(V0977)

Note: The values in the table above are for type B torch (French).

Brazing

a) Brazing work should be carried out such that the final result is directed either downwards or sideways. An upward direction should be avoided wherever possible. (to prevent leakage)



b) Liquid and gas pipe branches should always be dealt with in the specified way with attention being paid to the direction of the fitting and its angle. (to prevent oil return or drift)
For example see page 200.

c) It is standard working practice to use the nitrogen replacement method when brazing.

Important points

1. Every effort must be made to avoid fire. (Clean area where brazing is to be performed and make sure that fire fighting equipment and water are ready to hand.)
2. Be careful of burns.
3. Make sure that the gap between the pipe and the joint is correct. (To prevent leaks)
4. Is the pipe adequately supported?

■ As a rule the gaps between supports for horizontal piping (copper pipe) are as follows:

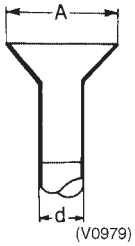
Copper pipe support spacing (From HASS 107-1977)

Nominal diameter	20 or less	25~40	50
Maximum gap (m)	1.0	1.5	2.0

■ The copper pipe should not be secured directly by metal brackets.

Flare Connection

(a) Stiffened pipe must always be annealed at least once prior to the flaring work.
(b) A pipe cutter must be used to cut the pipe. (A large pipe cutter must be used where the pipe has a large diameter. When cutting a pipe which is too big for the pipe cutter a metal saw may be used but care must be taken to ensure that the debris from sawing does not get into the pipe.)
(c) Set the flaring tool to make sure the flare size remains within the prescribed limits.



Nominal diameter	External diameter of pipe d	Pipe widening dimensions A
1/4	6.35	9.1
3/8	9.52	13.2
1/2	12.7	16.6
5/8	15.88	19.7
3/4	19.05	24.0

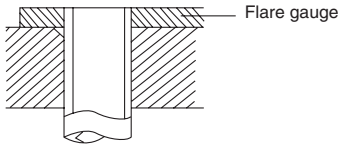
New Rank Compatible Flare Tool

Compared to previous refrigerants, the components of a HFC refrigerant is small. R-410A also has a higher pressure than other refrigerants. Therefore, in order to strengthen the intensity of the form and size of the flare section used for R-410A (class 2) apparatus, unlike the specification of the conventional refrigerants, it was set up with different standards.
When carrying out flare processing, use a new rank compatible flare tool or a conventional flare tool.

Flare Gauge (Adapter Corresponding to the New Rank)

When using the later, use a flare gauge to take out the pipe from the gauge bar, adjust it, and then carry out the flare processing.

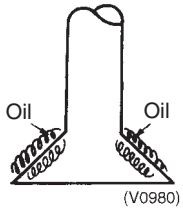
Size 12mm×72mm
Thickness 1.0×0.5mm Each



Size from the dice surface to the copper tip (in mm)

Name	Outer diameter	Wall thickness	Previous refrigerant (R-22, R-407C etc.)	R-410A
			The conventional flare tool	The conventional flare tool
			Clutch type	Clutch type
1/4”	6.35	0.8	0~0.5	1.0~1.5
3/8”	9.52	0.8	0~0.5	1.0~1.5
1/2”	12.70	0.8	0~0.5	1.0~1.5
5/8”	15.88	1.0	0~0.5	1.0~1.5

(d) Coat the inner and outer surface of the flare with refrigerator oil (Ester or ether oil). (this ensures that the flare nut passes smoothly, preventing the pipe from twisting.)
Do not use SUNISO-4GS oil.



Important points

1. Burrs should be carefully removed.
2. 2 spanners should be used to grip the flare nuts.
3. The flare nut must be inserted before starting the flaring operation.
4. The appropriate amount of torque should be used to tighten the flare nut.

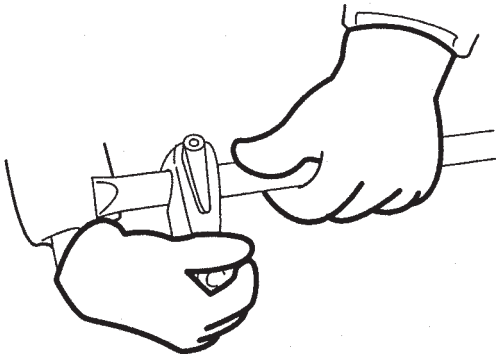
Standard torques for tightening flare nut ±10%

Size	Torque	
	(kgf-cm)	(N-cm)
1/4(6.4ϕ)	144~176	1420~1720
3/8(9.5ϕ)	333~407	3270~3990
1/2(12.7ϕ)	504~616	4950~6030
5/8(15.9ϕ)	630~770	6180~7540
3/4(19.1ϕ)	990~1210	9270~11860

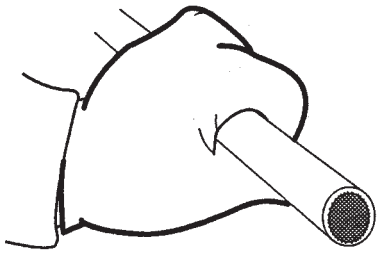
5. Check that there is no superficial damage to the surface of the flare.

Flaring Procedure

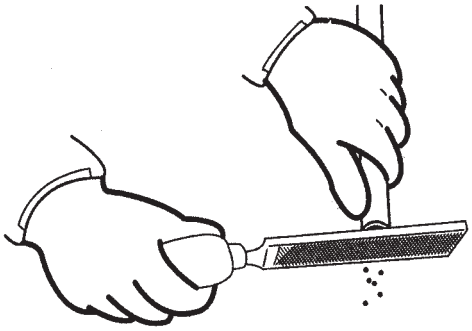
① Cut the pipe using a pipe cutter.



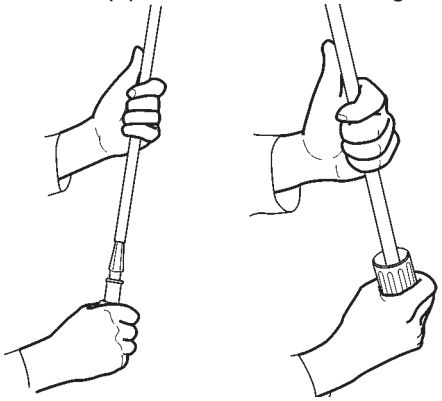
② The cut edge has burrs.
(The amount of burrs becomes larger when the pipe wall is thick



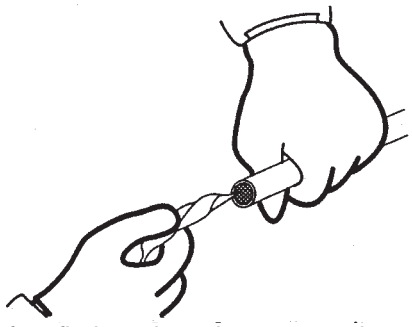
③ Remove the burrs using a file.
(Be careful not to let particles enter the pipe.
Point the pipe end downward during file



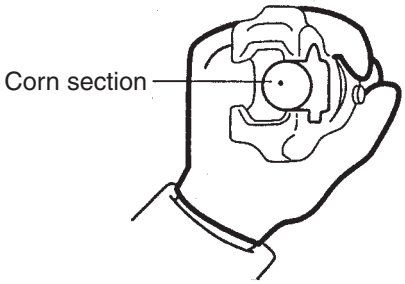
④ Remove the burrs using a reamer.
(Be careful not to let particles enter the pipe.
Point the pipe end downward during cutting.)



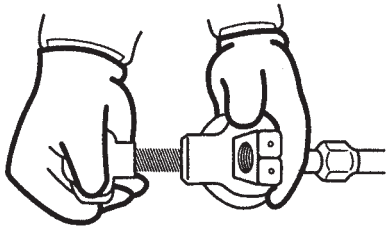
⑤ Clean the inside of the pipe.
(Use a thin stick with a cloth wrapped around it.)



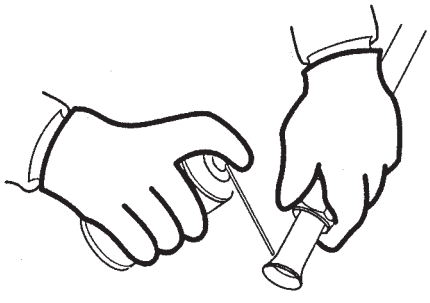
⑥ Before flaring, clean the cone section of the flaring tool.



⑦ Flare the pipe.
Rotate the flaring tool 3 or 4 turns after a clicking sound is produced. This results in a clean flared surface.

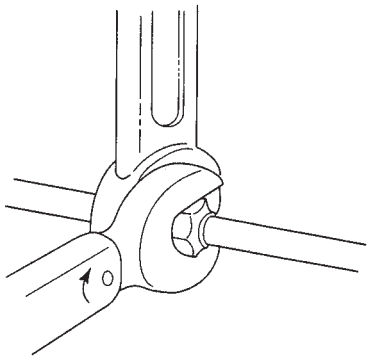


⑧ Apply refrigerant oil (Ester or ether oil) on the inside and outside of the flared section. (Do not apply SUNISO oil.)
(Be careful to keep dust away.)

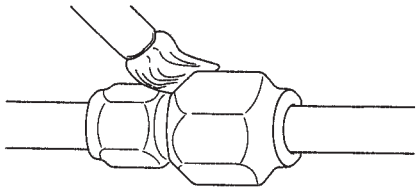


(V1352)

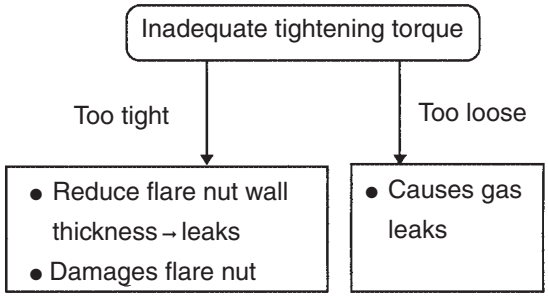
⑨ Tighten the flare nut.
(Use a torque wrench to apply the proper tightening force.)



⑩ Check for gas leaks.
(Check at the threaded section of the flare nut for gas leaks.)
Spray-type gas leak detecting products are available on the market. Soap water may be used to check for leaks, but use only neutral soap to prevent corrosion on the flare nut.
Be sure to wipe the nut area clean after the gas leak check.



Tighten the flare but with proper torque.
It takes a lot of experience to tighten the flare nut properly without the use of a torque wrench.



(V0984)

Not recommendable but in case of emergency

You must use a torque wrench but if you are obliged to install the unit without a torque wrench, you may follow the installation method mentioned below.

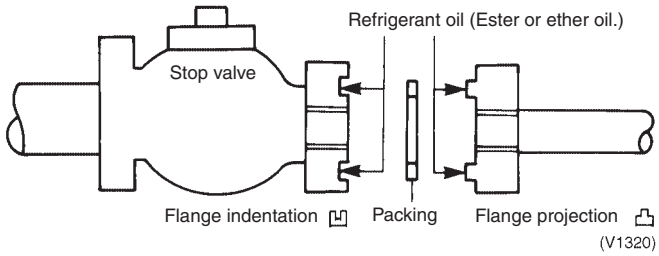
After the work is finished, make sure to check that is no gas leak.

When you keep on tightening the flare nut with a spanner, there is a point where the tightening torque suddenly increases. From that position, further tighten the flare nut the angle shown below:

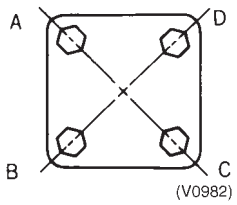
Pipe size	Further tightening angle	Recommended arm length of tool
6.4 (1/4”)	60 to 90 degrees	Approx. 150mm
9.5 (3/8”)	60 to 90 degrees	Approx. 200mm
12.7 (1/2”)	30 to 60 degrees	Approx. 250mm
15.9 (5/8”)	30 to 60 degrees	Approx. 300mm
19.1 (3/4”)	20 to 35 degrees	Approx. 450mm

Flange Connection

a) The flange sheet surface should be clean and undamaged. (Clean any dirt away with a cloth and check that there has been no damage.)
b) Coat the flange sheet surface with refrigeration oil (Ester or ether oil) and then insert the packing. (Do not use SUNISO oil.)



c) Tighten the bolts in opposite corners first to ensure that the connection is true.



[Example]
Order:A→C→B→D

The bolts should be tightened little by little in the above order such that the same degree of torque is applied evenly to each corner.

Important points

1. Only clean refrigeration/oil should be used to coat the flange. (i.e. free from dirt or water)
2. The correct amount of torque should be applied when tightening the flange bolts.

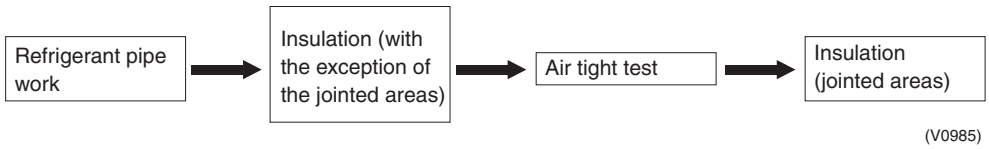
Standard torques for tightening screws and bolts

ISO hexagonal bolt

Class	5.8(5T)		10.9(10T)	
Size	kgf-cm ±15%	N-m ±15%	kgf-cm ±15%	N-m ±15%
M8	125	1230	302	2960
M10	257	2520	620	6080
M12	436	4280	1,050	10,300
M16	1,030	10,100	2,480	24,300
M20	2,050	20,100	4,950	48,500

3.2.4 Thermal Insulation Work (Refrigerant Piping)

- **Operational steps**



Materials

The thermal insulation materials which are used must be well able to withstand the heat from the pipes.
Example:
Heat pump type: Heat resistant polyethylene foam (heat resistance of at least 120°C)
Cooling only: Polyethylene foam (heat resistance of 100°C or more)

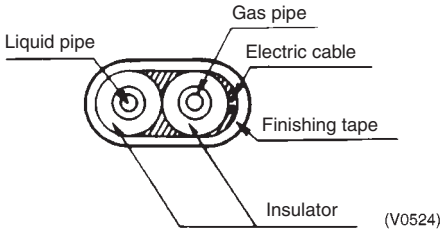
Essential Points of Thermal Insulation

The insulation of jointed areas such as the soldered, flared or flanged sections should only be carried out after the successful completion of the air tight test.

The tips for insulation

- Gas piping must be insulated.
- Be sure to insulate the liquid-side and gas-side piping for the inter-unit piping and the refrigerant branch kits and always use 18-type or better insulation for the oil pressure equalizer.
- Materials: Glass fiber or heat resistant polyethylene foam.
  Thickness: 10mm or more
  Heat resistance: Gas pipe : 120°C or more / Liquid pipe : 70°C or more
- If you think the humidity around the cooling piping might exceed 30°C and RH80%, reinforce the insulation on the cooling piping (at least 20mm thick). Condensation might form on the surface of the insulation.

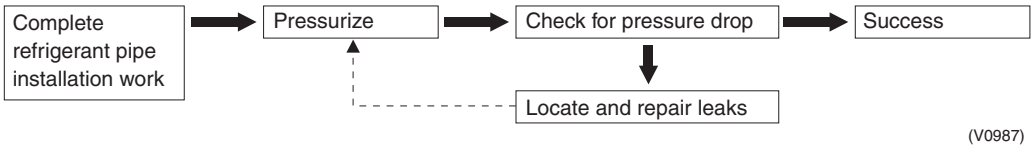
- Insulation of both liquid and gas pipe



Caution Be sure to size up the main gas line in the connecting piping of the suction gas piping if the equivalent length of the piping between the indoor and outdoor units exceeds 90m. In order to minimize the reduction of capacity caused by the pressure drop, the refrigerant pipe size may be sized up.

3.2.5 Air Tight Test

■ **Operational steps**



Essential Points of Testing (Maintaining Pressure Over a Period)

The key to successful testing is strict adherence to the following procedure:

a) The liquid and gas piping in each refrigerant system should be pressurized in turn in accordance with the following steps. (Nitrogen gas must be used.)

- **Step 1: increase pressure to 0.3MPa for 3 minutes or more**
- **Step 2: increase pressure to 1.5MPa for 3 minutes or more**

} Indicates existence of major leaks

- **Step 3: increase pressure to 4.00MPa for approx. 24 hours**

} Indicates existence of minor leaks

* Increasing the system pressure to 4.00MPa does not guarantee the identification of minor leaks if pressure is maintained for only a short time. It is therefore recommended that the system remain pressurized in accordance with Step 3 above for at least 24 hours.

Note: The pressure must on no account be increased beyond 4.00MPa.

b) Check for pressure drop

If there is no drop in pressure then the test is deemed a success.

If the pressure drops then the leak must be located. See following page.

However, if there is a change in the ambient temperature between the pressurizing stage and the time when you check for a drop in pressure then you will have to adjust your calculations accordingly since a change of 1°C can account for a pressure change of approximately 0.01MPa.

Compensating adjustment value:

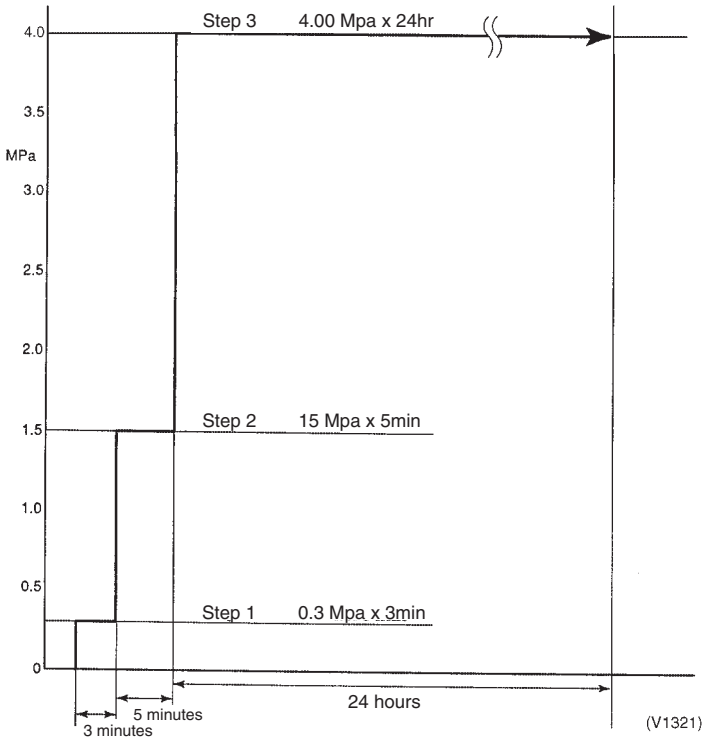
(temperature at time of pressurizing – temperature at time of checking) × 0.01

Example:

Time of pressurizing: 4.00MPa 25°C

24 hours later: 3.95MPa 20°C

The pressure drop in such a case is deemed to be zero (successful test).



Checking for Leaks

[Check 1] (Where pressure falls while carrying out Steps 1 to 3 described on previous page)

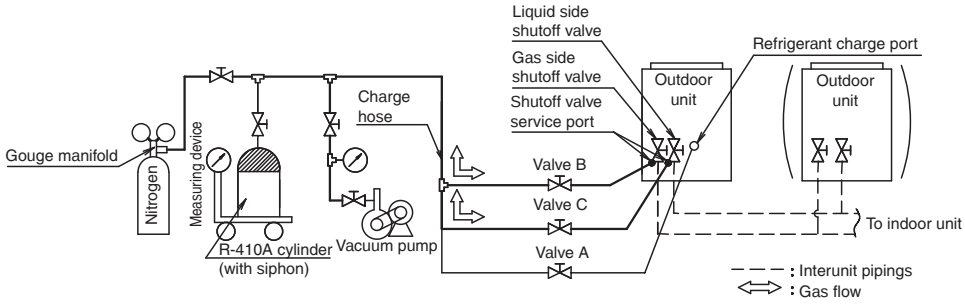
- Check by ear.....Listen for the sound of a major leak.
- Check by hand.....Check for leak by feeling around jointed sections with hand.
- Soap and water check (∗Snoop).....Bubbles will reveal the presence of a leak.

[Check 2] (When searching for a minor leak or when there has been a fall in pressure while the system has been fully pressurized but the source of the leak cannot be traced.)

1. Release the nitrogen until the pressure reaches 0.3MPa.
2. Increase pressure to 1.5MPa using gaseous flon gas (R-410A). (Nitrogen and flon gas mixed)
3. Search for the source of the leak using a leak detector.
4. If the source of the leak still cannot be traced then repressurize with nitrogen up to 4.00MPa and check again. (The pressure must not be increased to more than 4.00MPa.)

Setup of Air-tight Test

- Referring to following figure, connect an nitrogen tank, refrigerant tank, and a vacuum pump to the outdoor unit.
- The shutoff valve and valve A~C in following figure should be open or closed as shown in the table below.



■ **Important points**

1. Where the lengths of piping involved are particularly long then the air tight test should be carried out block by block.

Example:

1. Indoor side
2. Indoor side + vertical pipes
3. Indoor side + vertical pipes + outdoor side

3.2.6 Vacuum Drying

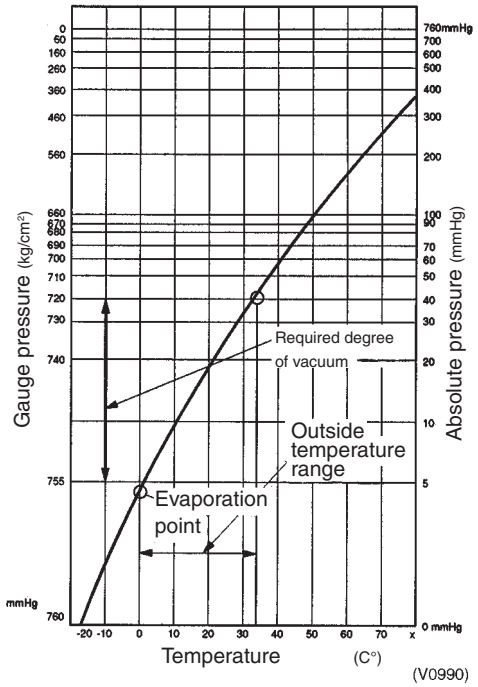
What is vacuum drying?

Vacuum drying is:
"The use of a vacuum pump to vaporize (gasify) the moisture (liquid) inside the pipes and expel it leaving the pipes completely dry inside."
At 1 atm (760 mmHg) the boiling point (evaporating temperature) of water is 100°C but if a vacuum is created inside the pipes using a vacuum pump then the boiling point is rapidly reduced as the degree of the vacuum is increased. If the boiling point is reduced to a level below that of the ambient temperature then the moisture in the pipes will evaporate.

<Example>
When outside temperature is 7.2°C
As shown in the table on the right, the degree of vacuum must be lowered below –752mmHg. →

Boiling point of water (°C)	Pressure		
	∗mmHg	Pa	Torr
40	–705	7333	55
30	–724	4800	36
26.7	–735	3333	25
24.4	–738	3066	22
22.2	–740	2666	20
20.6	–742	2400	18
17.8	–745	2000	15
15.0	–747	1733	13
11.7	–750	1333	10
7.2	–752	1066	8
0	–755	667	5

Above figures (mmHg) are gauge pressure readings.



The evacuation of air conditioner piping provides the following effects.
1. Vacuum drying
2. Removes air and nitrogen (used in air-tightness test) from the inside of pipes.

Therefore, it is necessary to ensure that the both purposes have been achieved in the vacuum drying operation.

Key points
Lower the degree of vacuum to below –755mmHg

(V1216)

Choosing a Vacuum Pump

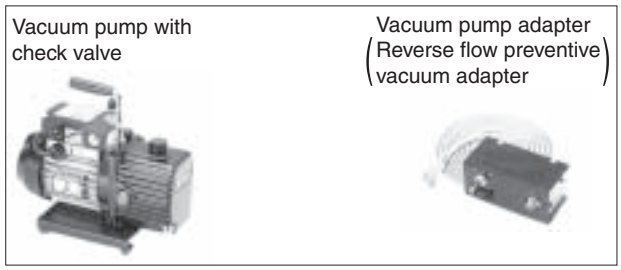
General

Refrigerant piping content volume of the VRV III R-410A Series is larger than the VRV Inverter Series, and consequently takes more time for vacuum drying. If you have time to spare, you may use the same vacuum pump, but if you want to save time, you will have to use a pump with higher exhaust velocity (exhaust volume).

The Necessity for Counter Flow Prevention

After the vacuum process of the refrigerant cycle, the inside of the hose will be vacuumed after stopping the vacuum pump, and the vacuum pump oil may flow back. Moreover, if the vacuum pump stops during the operation by some reason, the same thing happens.
In such cases, different oil mixes in the HFC system refrigerant apparatus cycle, and becomes the cause of a refrigerant circuit trouble. Therefore, in order to prevent the counter flow from the vacuum pump, a check valve is needed.

Vacuum pump with check valve or vacuum pump adapter



1. **Vacuum pump performance**
   The 2 most import things for determining vacuum pump performance are as follows:
   (1) Exhaust velocity
   (2) Degree of vacuum

(1) Exhaust velocity

Exhaust volume is usually expressed as l/min or m³/h. The larger the number, the faster vacuum id achieved.

Generally speaking, the faster the exhaust velocity, the larger and heavier the vacuum pump itself is.

Commercially available vacuum pumps (exhaust velocity of 20 - 30 l/min) usually take an extremely long time to achieve vacuum. (We recommend a vacuum pump of approx. 60 - 100 l/min.)

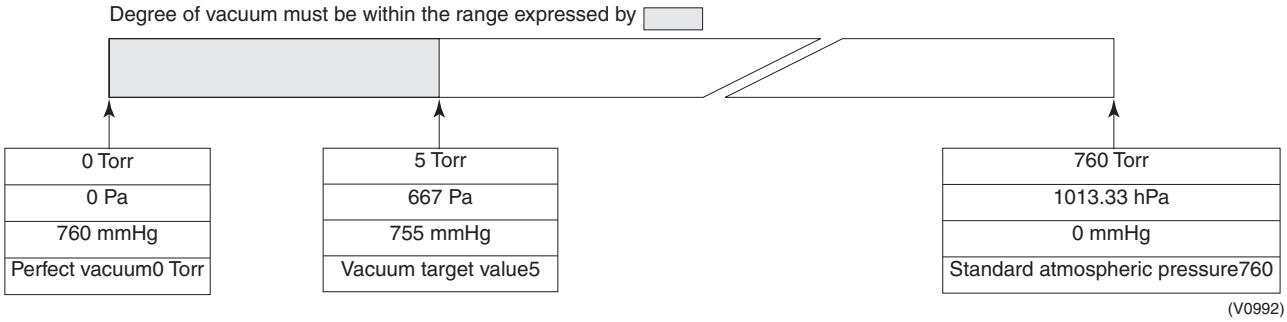
(2) Degree of vacuum

Ultimate vacuum varies largely according to use of the vacuum pump. Vacuum pumps used for vacuum forming cannot be used for vacuum drying. (A vacuum pump with a high degree of vacuum is required.)

When selecting a vacuum, you should select one which is capable of achieving 0.2 Torr of ultimate vacuum.

Degree of vacuum is expressed in Torr, micron, mmHg, and Pascal (Pa). The units correlate as follows:

	Unit	Standard atmospheric pressure	Perfect vacuum
Gauge Pressure	kg/cm2	0	–1.033
Absolute Pressure	kg/cm2 abs	1.033	0
Torr	Torr	760	0
Micron	Micron	760000	0
∗mmHg	mmHg	0	760
Pa	hPa	1013.33	0



2. Vacuum pump maintenance

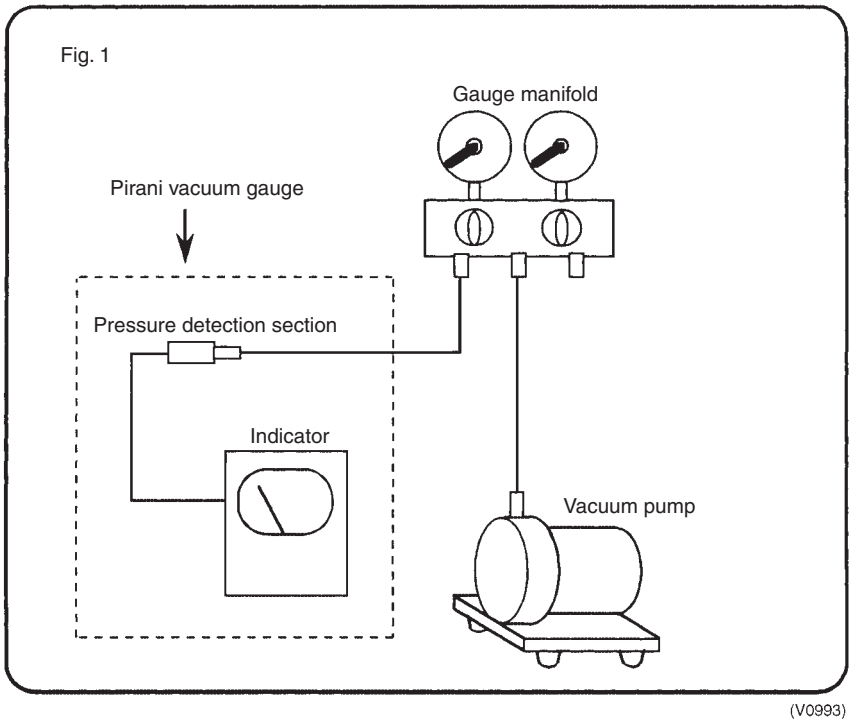
Because of their nature, most vacuum pumps contain large amounts of oil which lubricates bearings, etc., and functions to enhance airtightness of pistons. When using a vacuum pump to discharge air from refrigerant piping, moisture in the air tends to get mixed in with the oil. You must therefore change oil periodically and make sure the proper oil level is maintained. (Perform periodic inspections in accordance with the operating instructions.)

3. Degree of vacuum measurement

An extremely accurate vacuum gauge is required to test degree of vacuum. You cannot accurately measure degree of vacuum with the compound gauge on the gauge manifold. A Pirani vacuum gauge is required to measure degree of vacuum accurately. Because Pirani gauges are very sensitive and require extreme care when using, they are not very suitable for use in the field. You should therefore use the Pirani gauge to calibrate the attached vacuum gauge on the gauge manifold and the degree of vacuum of the vacuum pump.

4. Calibration method

1. Connect a Pirani vacuum gauge and the gauge manifold vacuum gauge (0 - 760 mmHg) to the vacuum pump at the same time, and run the pump for about 3 minutes.
2. Make sure the reading of the Pirani vacuum gauge is 5 Torr (667 Pa) or less. The reading of conventional vacuum pumps lowers to about 0.2 Torr.
   If the reading is not 5 Torr or less, check the vacuum pump oil. (Oil is low in many cases.)
3. Check the attached gauge on the gauge manifold. Adjust the gauge if the reading is not exactly correct.
4. Adjust the gauge manifold valve so that the Pirani vacuum gauge reads 5 Torr.
5. Mark the position indicated by the gauge manifold gauge with an oil based ink pen.
6. Use the mark of the gauge manifold as a target when vacuuming in the field.



(Reference) Types of vacuum pump with respective maximum degree of vacuum

Type	Maximum Degree of Vacuum / Expulsion Capacity	Use: Vacuum Drying	Use: Air Expulsion	
Oil Rotary (Oil Using)	0.02 mmHg / 100 l/min	Suitable	Suitable	
Oilless Rotary (No Need of Oil)	10 mmHg / 50 l/min	Unsuitable	Suitable	
	0.02 mmHg / 40 l/min	Suitable	Suitable	←Many handy pumps fall into this category

Vacuum Drying Procedure

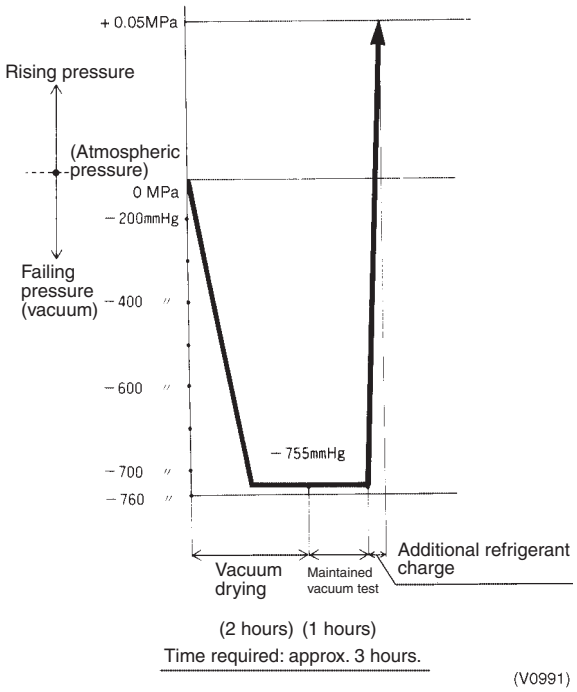
There are two vacuum drying methods and the appropriate one should always be chosen to conform with individual local conditions.
[Normal vacuum drying].....The standard method

[Operational steps]

1. Vacuum drying (1st time): Connect a manifold gauge to the service port of the liquid or gas pipe and operate the vacuum pump for at least 2 hours.
   (The degree of vacuum produced should be in excess of -755 mmHg)
   If after 2 hours the vacuum produced has not exceeded 5 mmHg then either there is moisture in the pipe or there is a leak. Operate the vacuum pump for a further hour.
   If, even after 3 hours, the vacuum has not reached -755 mmHg then check the system for a leak.
2. Carry out maintained vacuum test.
   Produce a vacuum in excess of -755 mmHg and do not release it for an hour or more. Check the vacuum gauge to make sure that it has not risen. (If the gauge does rise then there is still moisture in the pipe or there is a leak somewhere.)
3. Additional charge of refrigerant.
   Connect the charging cylinder to the liquid pipe service port and charge with the required amount of refrigerant.
4. Open stop valve to the full.
   Open the stop valves on the liquid and the gas pipes to the full.

Note: Vacuums should be produced in both the liquid and the gas pipes.
(Because there are a large number of functional components in the indoor unit which cut off the vacuum mid–way through)

[Standard vacuum drying time chart]



Special vacuum drying

This vacuum drying method is selected when there is a suspicion that there may be moisture in the pipes.
For example:

- When moisture was discovered during the refrigerant pipe flushing operation
- When there is a risk of condensation forming inside the pipes during periods of heavy rainfall
- When there is a risk of condensation forming inside the pipes if this refrigerant pipe works takes long time
- When there is a risk that rainwater may have entered the pipes during installation

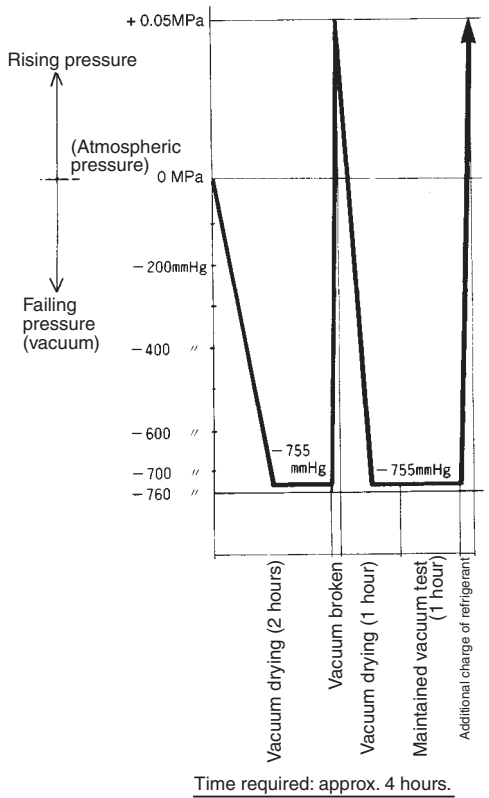
The special vacuum drying method is the same as the standard method except that nitrogen is introduced into the pipes to break the vacuum on one or more occasions during the course of the operation.

[Operational steps]

1. Vacuum drying (1st time): 2 hours
2. Vacuum breaking (1st time): Use nitrogen to raise pressure to +0.05MPa.
   (Since the nitrogen gas used to break the vacuum is dry nitrogen this process serves only to enhance the overall drying effect of the vacuum drying operation itself.
   However, since the effectiveness of this process is severely impaired by a high moisture level inside the pipes, the utmost care is required during installation to see that water does not enter or form inside the refrigerant pipes.)
3. Vacuum drying (2nd time): Operate the vacuum pump for at least 1 hour.
   (Observations: Degree of vacuum has reached -755 mmHg. If the degree of vacuum has not reached -755 mmHg after 2 hours or more then repeat the operations at 2 (vacuum breaking) and 3 (vacuum drying) above.)
4. Carry out maintained vacuum test: 1 hour
5. Additional charge of refrigerant
6. Open stop valve to the full

* The gas used for the vacuum breaking operation must be nitrogen.
  (The use of oxygen brings a serious risk of explosions)

[Special vacuum drying time chart]



Time required: approx. 4 hours.

(V0994)

3.2.7 Additional Charge of Refrigerant at installation time

■ **Operational steps**

Use the length of the piping to calculate the amount of refrigerant required → Additional charge of refrigerant

(V0995)

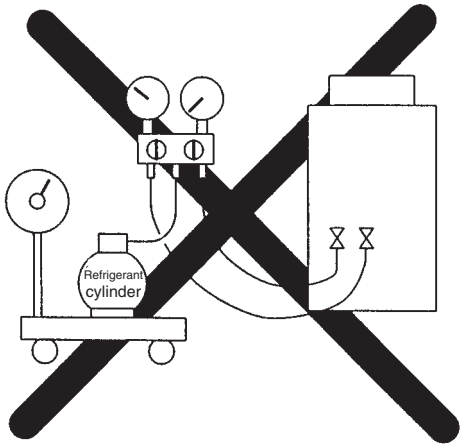
Important points

1. The results of all calculations must be recorded. (Make a list.)
2. The refrigerant will need to be additionally charged whenever the distance between the outdoor unit and the most distant indoor unit is more than 10m.
3. The additional charging operation should be carried out by input of liquid from Service port at liquid stop valve following completion of the vacuum drying operation.
4. When the additional charging operation cannot be satisfactorily completed use the action of the compressor to complete the additional charging during the test run.

Refrigerant Charging Instructions

HFC401A are Quasi-azeotropic* refrigerants. Therefore, these refrigerants must be charged in the liquid state. When charging the refrigerant into equipment from the refrigerant cylinder, turn the refrigerant cylinder upside down.

Important: Make sure that the refrigerant (liquid) is taken out from the bottom part of the refrigerant cylinder. Do not take out the refrigerant (gas) at the upper part of the refrigerant cylinder for charging.



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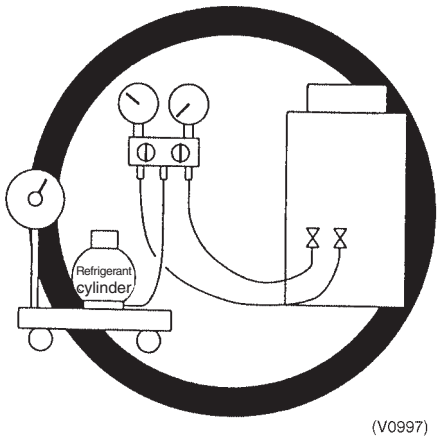
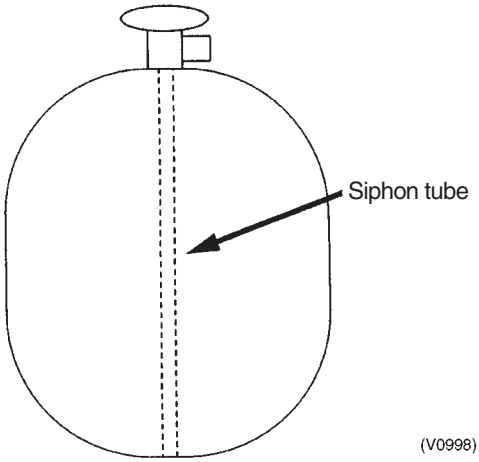


(V0997)

Caution Since some refrigerant cylinders differ in the internal mechanism, it is necessary to examine the cylinder carefully. (Some cylinders have a siphon tube to eliminate the need for turning it upside down.)

Siphon tube



(V0998)

<*Non-azeotropic refrigerants or Quasi-azeotropic refrigerants>
When a refrigerant is a mixture of two or more types with different evaporation temperature, it is called a non-azeotropic refrigerant. If all refrigerant components evaporate at the same temperature, the mixture is called an azeotropic refrigerant.
If a non-azeotropic refrigerant is charged into equipment in the gaseous state, the refrigerant components that evaporate sooner than others enter the equipment, and the refrigerant that evaporate after others remain in the refrigerant cylinder.

* Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.

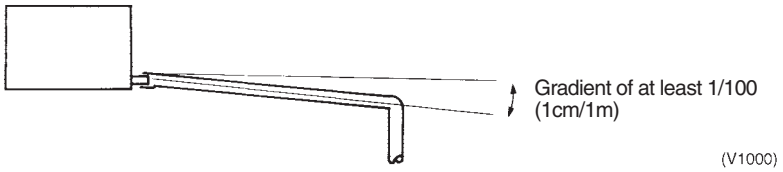
Caution items
The following devices designed for R-22 cannot be used to charge the new refrigerants. Be sure to use the devices specifically designed for the new refrigerants.
1. Charging cylinder...(Pressure resisting specification is different.)
2. Gauge manifold (including hose)...(same as above)

3.2.8 Drain Pipe Work (Indoor)

■ **Operational steps**

Drain Pipe Gradient and Support

a) The drain pipe must be fitted at a gradient of at least 1/100.
The drain pipe should be as short as possible and free from airlocks.



b) Suspension bolts should be used to support long stretches of drain pipe in order to ensure that a gradient of 1/100 is maintained. (PVC pipes should not be bent)

Spacing of supports for horizontal piping

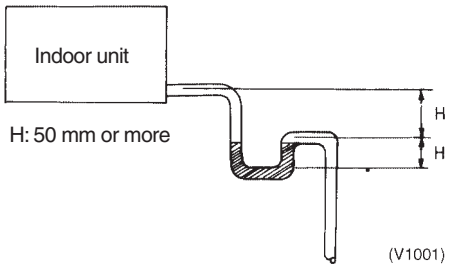
Class	Nominal diameter	Spacing
Rigid PVC pipe	25~40mm	1~1.5m

c) The length of pipe laid horizontally should be kept to a minimum.

Drain Trap

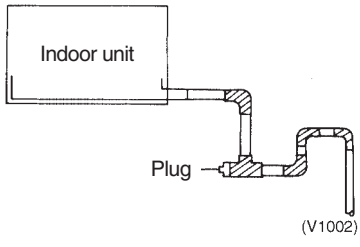
Fit any indoor unit whose drain pipe connection is subjected to negative pressure, with a drain trap.
(FXYMP40~125 only)

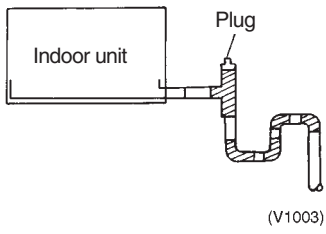
a) Rig the drain trap as shown in the drawing below.



b) Provide one trap per unit. A single trap for converging units will prove ineffective.

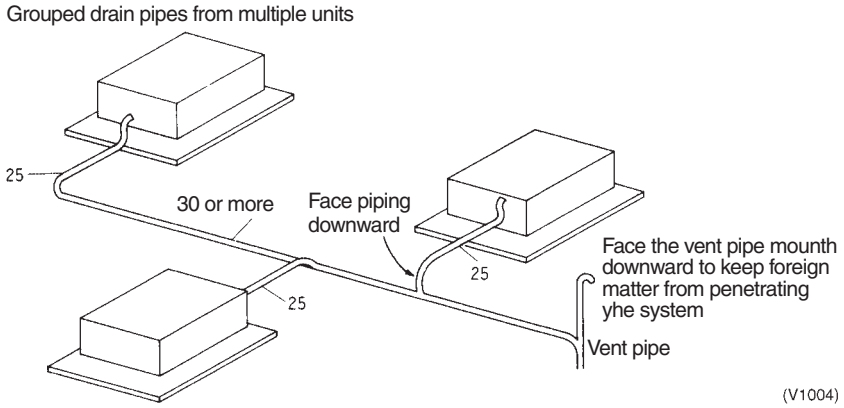
c) Rig the trap to allow for future cleaning.





Grouped Drain Piping

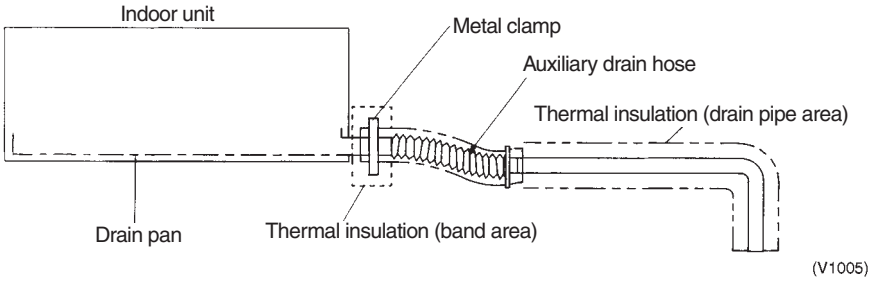
1. It is standard work practice to make connections to the main pipe from above. The pipe down from the combination should be as large as possible.

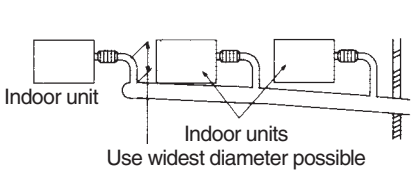


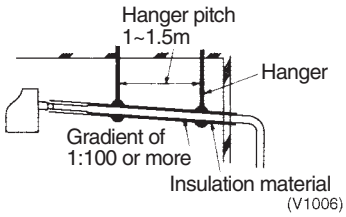
2. The pipework should be kept as short as possible and the number of indoor units per group kept to a minimum.

Use of an Auxiliary Drain Hose (Flexible)

If a drain pan made of polystyrene foam is used then an auxiliary drain hose (flexible) is also essential. A flexible drain hose permits the drain socket and drain pipe to be connected without difficulty and prevents any undue strain being placed on the drain pan.







Important points

1. The drain pipe should be at least equal in size to that of the indoor unit.
2. The drain pipe is thermally insulated to prevent the formation of condensation inside the pipe.
3. The drain up mechanism should be fitted before the indoor unit is installed and when the electricity has been connected some water should be added to the drain pan and the drain pump checked to see that it is functioning correctly.
4. All connections should be secure. (Special care is needed with PVC pipe)
   The use of a colored adhesive with PVC pipes will help you to remember to connect them up.)

Piping Diameter for Grouped Drain Pipes

- Select piping diameter from the below table in accordance with the amount of condensation drained by all units with a common drain pipe.
- Consider 2 l/hr of drainage for every 1 HP. For example, drainage from 3 units running at 2 HP and 2 units running at 3 HP is calculated as follows.
  2 (l/hr) × 2 (HP) × 3 (units) + { 2 (l/hr) × 3 (HP) × 2 (units) = 24 l/hr

1. Relationship between horizontal pipe diameter and allowable drainage (for extended ventilation system)

JIS nominal	Vinyl chloride pipe diameter (mm)	Allowable flow rate (l/hr)		Remarks
		Piping gradient 1:50	Piping gradient 1:100	
VP20	20	39	27	(Reference value) Cannot be used in grouped piping.
VP25	25	70	50	
VP30	31	125	88	Can be used in grouped piping.
VP40	40	247	175	
VP50	51	473	334	

Notes:
- Calculations have been made with water area inside the pipe as 10%.
- Allowable flow rate figures below the decimal have been discarded.
- Use VP30 or larger pipe after the convergence point.

2. Relationship between riser diameter and allowable drainage (for extended ventilation system)

JIS nominal	Vinyl chloride pipe diameter (mm)	Allowable flow rate (l/hr)	Remarks
VP20	20	220	(Reference value) Cannot be used in grouped piping.
VP25	25	410	
VP30	31	730	Can be used in grouped piping.
VP40	40	1440	
VP50	51	2760	
VP65	67	5710	
VP75	77	8280	

Notes:
- Allowed flow rate figures below the decimal have been discarded.
- Use VP30 or larger pipe in risers.
- Use the same drain pipe for the humidifier as the indoor unit.

3.2.9 Drain Piping for Each Model

Ceiling Mounted Cassette Type (FXCQ-M Double flow)

Drain Pump Kit

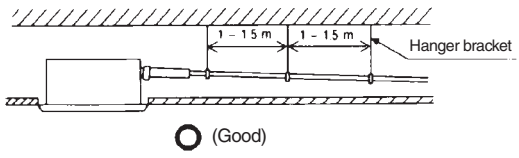
Indoor unit	Drain pump kit
FXCQ–M	Standard (Equipped with indoor unit)

Drain Piping Work

〈〈**Rig the drain pipe as shown below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.**〉〉

(1) Carry out the drain piping

- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe (vinyl tube, pipe size: 25 mm; outer dimension: 32 mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m.



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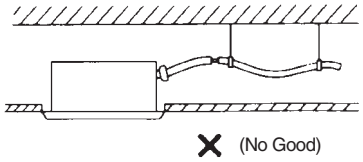
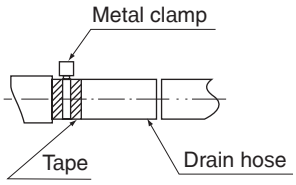
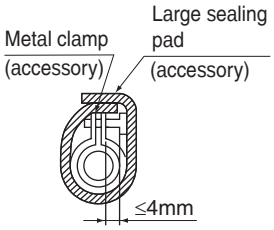


(V0616)

Caution Setting the unit at an angle opposite to the drain piping might cause leaks.

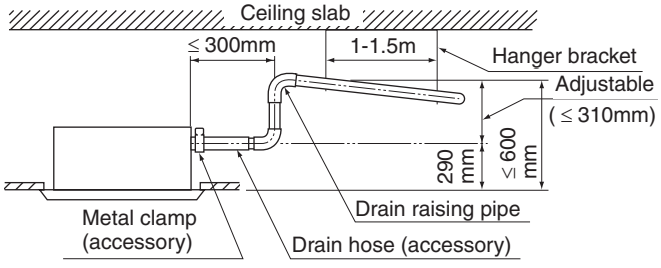
- Use the attached drain hose and clamp metal.
  Insert the drain hose into the drain socket, up to the white tape. Tighten the clamp until the screw head is less than 4mm from the hose.
- Wrap the attached sealing pad over the clamp and drain hose to insulate.
- Insulate the drain hose inside the building.



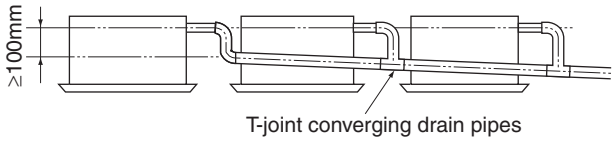


(PRECAUTIONS FOR DRAIN RAISING PIPING)

- Install the drain raising pipes at a height of less than 310 mm.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm from the unit.



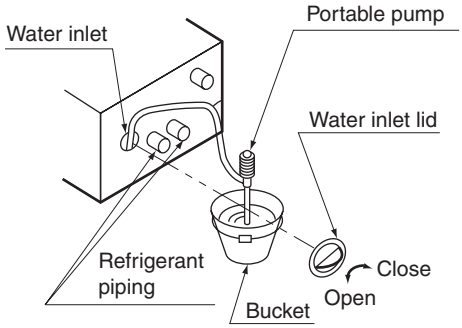
- If converging multiple drain pipes, install according to the procedure shown below.



Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

(2) After piping work is finished, check drainage flows smoothly.

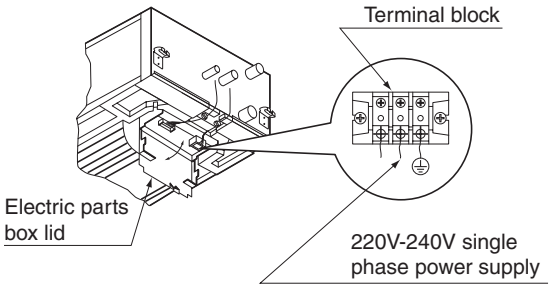
- Open the water inlet lid, add approximately 2.5 liter of water gradually and check drainage flow.



WHEN ELECTRIC WIRING WORK IS FINISHED

- Check drainage flow during COOL running, explained under "TEST OPERATION".

WHEN ELECTRIC WIRING WORK IS NOT FINISHED



- Remove the electric parts box lid, connect a power supply and remote control to the terminals.
  (Refer to the “HOW TO CONNECT WIRINGS”)
  Be sure attach the electric parts box lid before turning on the power.
- Next, press the inspection / test operation button “ TEST ” on the remote control. The unit will engage the test operation mode. Press the operation mode selector button “ ” until selecting FAN OPERATION “ ”. Then, press the ON / OFF button “ ”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “ TEST ” to go back to the first mode.
- **Be careful when doing so because the fan is turning at the same time.**
- Attach the electric parts box lid as before.

Caution

- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

3PR01906-7R

Ceiling Mounted Cassette Type (FXFQ-M Multi-flow)

Drain Pump Kit

Indoor unit	Drain pump kit
FXFQ-M	Standard (Equipped with indoor unit)

Drain Piping Work

(1) Carry out the drain piping

- Lay pipes so as to ensure that drainage can occur with no problems.
- Employ a pipe with either the same diameter or with the diameter larger (excluding the raising section) than that of the connecting pipe (PVC pipe, nominal diameter 25 mm, outside diameter 32 mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m.

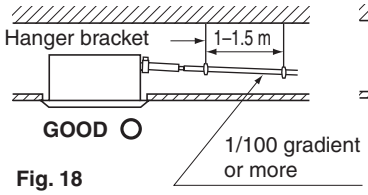


Fig. 18

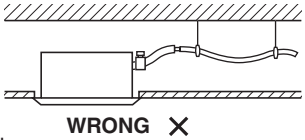


Fig. 19

- Use the attached drain hose (1) and clamp (2).
- Insert the drain hose into the drain socket up to the base, and tighten the clamp securely within the portion of a white tape of the hose-inserted tip. Tighten the clamp until the screw head is less than 4 mm from the hose.
- Wrap the attached sealing pad (10) over the clamp and drain hose to insulate.
- Make sure that heat insulation work is executed on the following 2 spots to prevent any possible water leakage due to dew condensation.
  - Indoor drain pipe
  - Drain socket

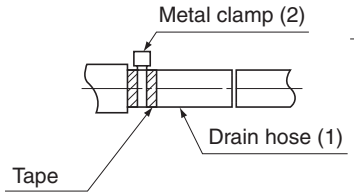


Fig. 20

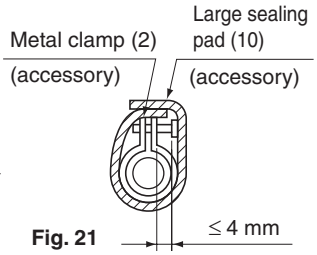


Fig. 21

3PA60996-14Y

<PRECAUTIONS FOR DRAIN RAISING PIPING>

- Install the drain raising pipes at a height of less than 550 mm.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm from the unit.

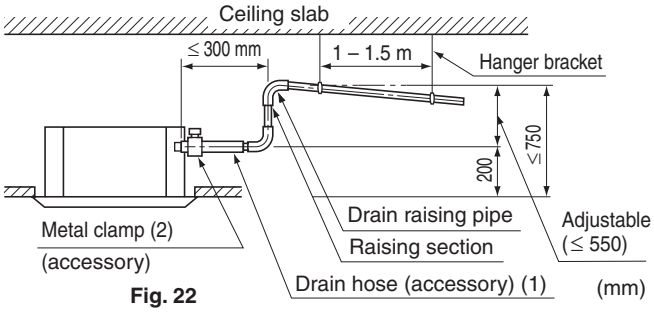


Fig. 22

Note:

- To ensure no excessive pressure is applied to the included drain hose (1), do not bend or twist when installing. (This may cause leakage.)
- If converging multiple drain pipes, install according to the procedure shown below.

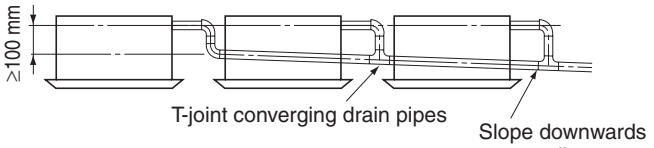


Fig. 23

Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

(2) After piping work is finished, check if drainage flows smoothly.
Add approximately 2 liter of water slowly from the air outlet and check drainage flow.

WHEN ELECTRIC WIRING WORK IS FINISHED

■ Check drainage flow during COOL running, explained under "TEST OPERATION".

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

■ Remove the terminal box lid connect a power supply and remote control to the terminals. (Refer to the Installation Manual)

Next, press the inspection/test operation button " TEST " on the remote control. The unit will engage the test operation mode. Press the operation mode selector button " " until selecting FAN OPERATION " ". Then, press the ON/OFF button " ". The indoor unit fan and drain pump will start up. Check that the water has brained from the unit. Press " TEST " to go back to the first mode.

■ **Note that the fan also starts rotating.**
Attach the terminal box lid as before.

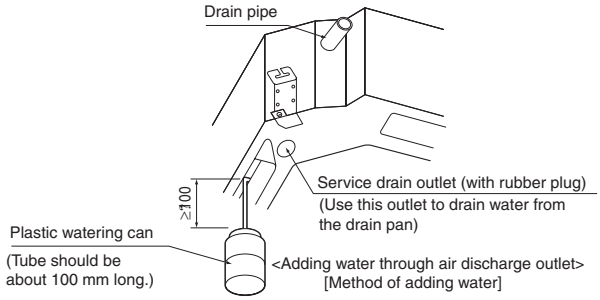


Fig. 24

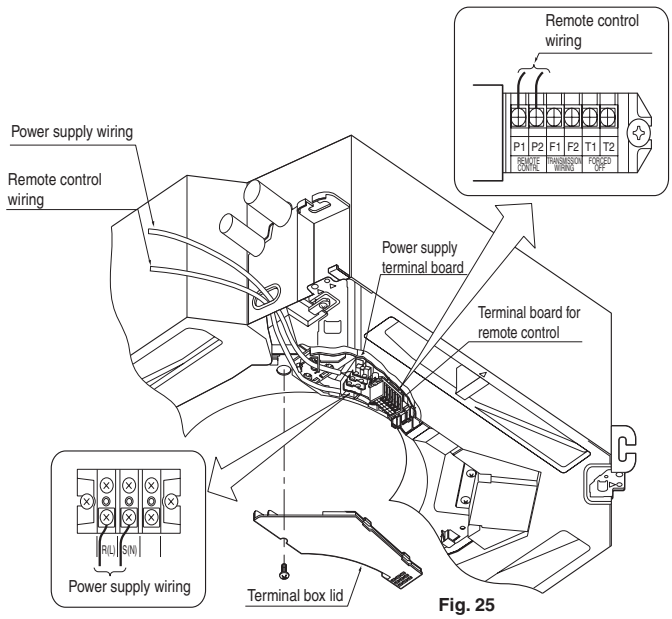


Fig. 25

Caution:

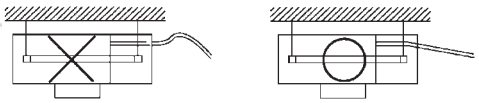
- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked it water collects on drain pipe.

3PA60996-14Y

Ceiling Mounted Cassette Corner Type (FXKQ-MA)

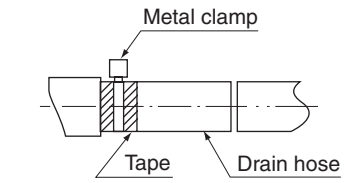
Drain Piping Work

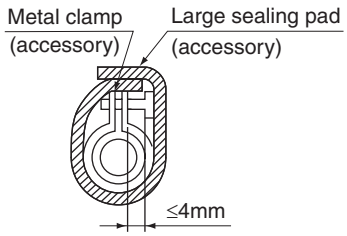
〈〈**Rig the drain pipe as shown below and take measures against condensation. Improperly rigge piping could lead to leaks and eventually wet furniture and belongings.**〉〉



(1) Carry out the drain piping.

- Keep piping as short as possible and slope it downwards so that air may not remained trapped inside the pipe.
- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe (vinyl tube; pipe size : 25 mm ; outer dimension : 32 mm).
- Use the drain hose and metal clamp. Insert the drain hose into the drain socket, up to the white tape. Tighten the metal clamp until the screw head is less than 4 mm from the hose.



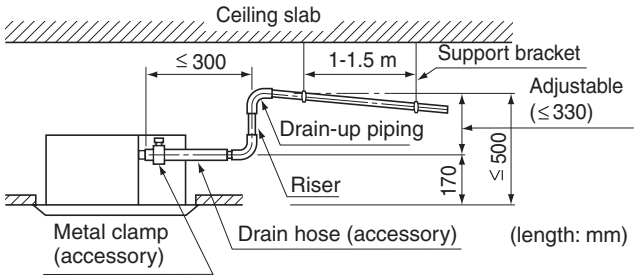


Caution Setting the unit at an angle opposite to the drain piping might cause leaks.

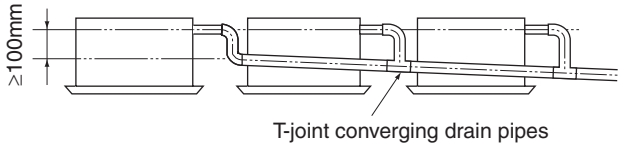
- Wrap the sealing pad over the clamp and drain hose to insulate.
- Insulate the drain hose inside the building.
  While referring to the figure on the right, insulate the clamp and drain hose with the large sealing pad.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- Secure a downward gradient of 1 / 100 or more for the drain pipe. To accomplish this, mount supporting brackets at an interval of 1 - 1.5 m.

〈**Precautions when doing drain-up piping work.**〉

- Make sure the drain-up piping is at most 330 mm high.
- Stand the drain-up piping horizontally, and make sure it is not further than 300 mm from the base of the drain socket.



- Use the following outline if laying concentrated drain piping.
- If converging multiple drain pipes, install according to the procedure shown below.

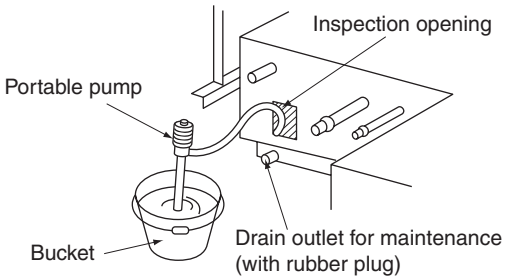


Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

3P086156-8V

(2) After piping work is finished, check drainage flows smoothly.

- Open the inspection opening, add approximately 1liter of water slowly into the drain pan and check drainage flow.



Note: Use the drain outlet for maintenance to drain water from the drain pan.

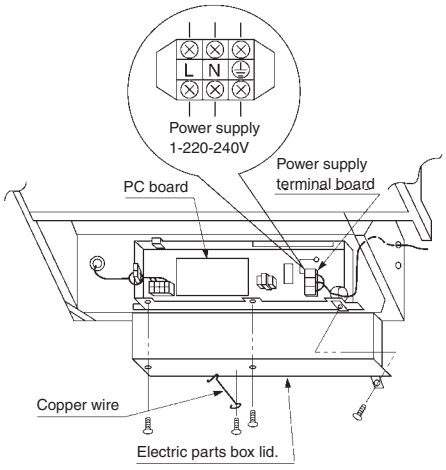
WHEN ELECTRIC WIRING WORK IS FINISHED

- Check drainage flow during COOL running, explained under "TEST OPERATION".

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

- Remove the electric parts box lid connect a power supply and remote control to the terminals. (Refer to the **Installation Manual**)

Be sure attach the electric parts box lid before turning on the power.
Next, press the inspection/test operation button " TEST " on the remote control. The unit will engage the test operation mode. Press the operation mode selector button " " until selecting FAN OPERATION " ". ". Then, press the ON/OFF button " ". The indoor unit fan and drain pump will start up. Check that the water has brained from the unit. Press " TEST " to go back to the first mode.



3P086156-8V

Caution

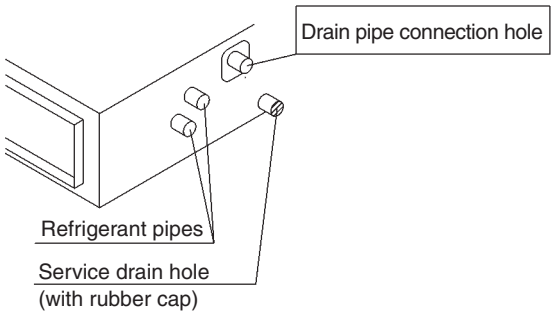
- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

Slim Ceiling Mounted Duct Type (FXDQ)

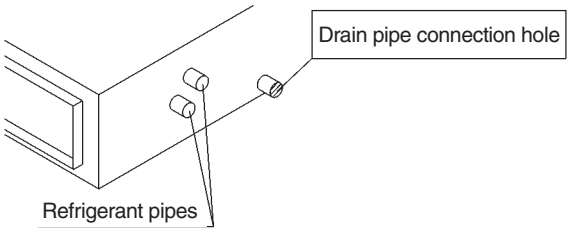
Drain Piping Work

1. Install the drain piping.

In case of PVE, NAVE (with Drain Pump) Type



In case of PVET, NVET (without Drain Pump) Type



Connect the drain pipe after removing the rubber cap and insulation tubing attached to the connection hole.

- Make sure the drain works properly.
- The diameter of the drain piping should be greater than or equal to the diameter of the connecting pipe (vinyl tube; pipe size: 20 mm; outer dimension: 26 mm). (not including the riser)
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming. **(Refer to Fig. 10)**

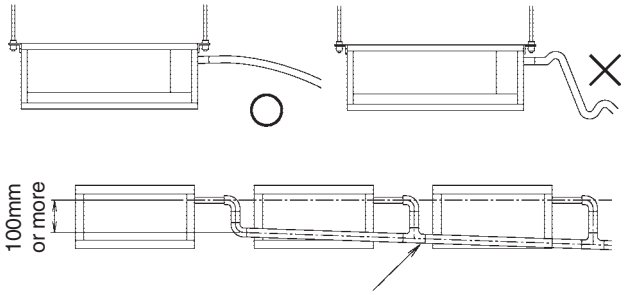


Fig. 10

Caution **Water accumulating in the drain piping can cause the drain to clog.**

- To keep the drain piping from sagging, space hanging bracket every 1 to 1.5 m.
- Use the drain hose (2) and the metal clamp (1). Insert the drain hose (2) fully into the drain pipe connection hole and firmly tighten the metal clamp (1) with the upper part of the tape on the hose end. Tighten the metal clamp (1) until the screw head is less than 4 mm from the hose. **(Refer to Fig. 11, 12)**
- The two areas below should be insulated because condensation may form there causing water to leak.
  - Drain piping passing indoors
  - Drain pipe connection hole

Referring the figure below, insulate the metal clamp (1) and drain hose (2) using the included large sealing pad (5). **(Refer to Fig. 12)**

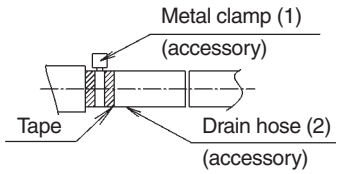


Fig. 11

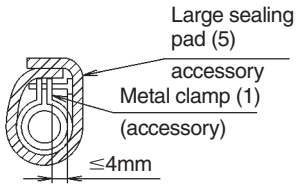


Fig. 12

3PN05141-4S

In case of PVE · N(A)VE (with Drain Pump) Type

<PRECAUTIONS FOR DRAIN RAISING PIPE>

- Make sure the drain raising pipe height is no higher than 600mm.
- Place the drain raising pipe vertically and make sure it is no further than 300mm from the unit. **(Refer to Fig. 13)**

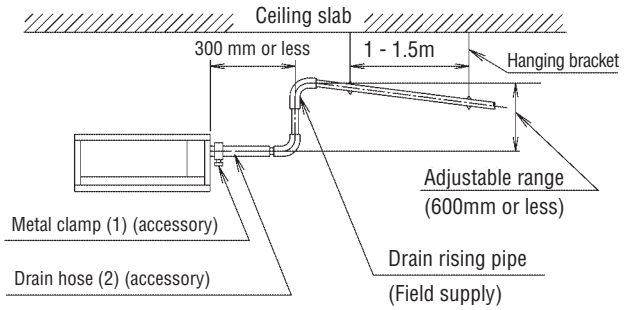


Fig. 13

<PRECAUTIONS>

Drain piping connections

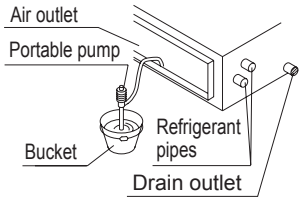
- Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain piping and corrode the heat exchanger.
- Do not twist or bend the drain hose (2), so that excessive force is not applied to it. (This type of treatment may cause leaking.)
- If you are using central drain piping, follow the procedure outlined in the figure 10.
- Select central drain piping of proper size according to the capacity of the connected unit.

3PN05141-4S

2. After piping work is finished, check drainage flows smoothly.

- Gradually insert approximately 1L of water into the drain pan to check drainage in the manner described below.

In case of NVET Type



- Gradually pour approximately 1L of water from the outlet hole into the drain pan to check drainage.
- Check the drainage

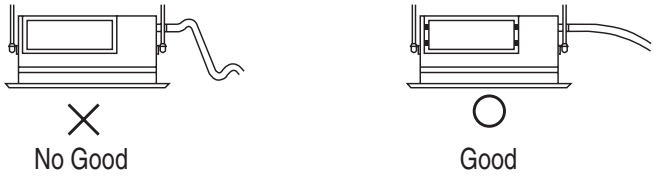
Ceiling Mounted Built-in Type (FXSQ-M)

Drain Piping Work

<<Rig the drain pipe as shown below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.>>

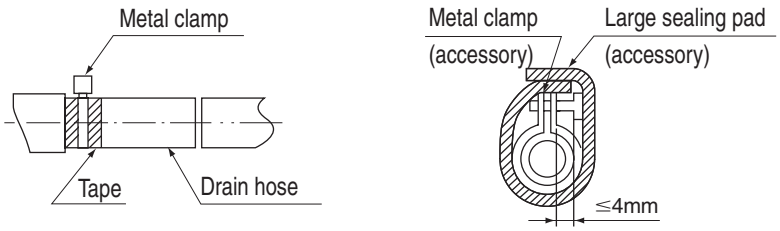
(1) Carry out the drain piping

- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe (vinyl tube; pipe size: 25 mm; outer dimension: 32 mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m.



Caution Setting the unit at an angle opposite to the drain piping might cause leaks.

- Use the attached drain hose and clamp metal. Tighten the clamp firmly. Insert the drain hose into the drain socket, up to the white tape. Tighten the clamp until the screw head is less than 4 mm from the hose.
- Wrap the attached sealing pad over the clamp and drain hose to insulate.
- Insulate the drain hose inside the building.



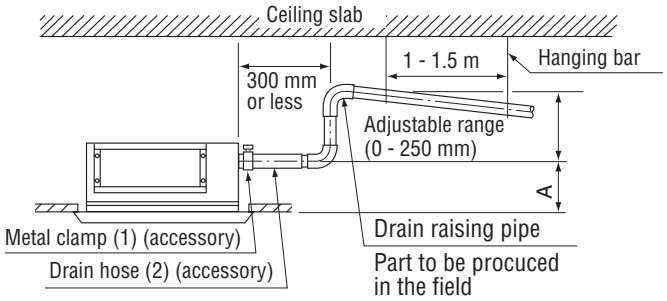
〈 **PRECAUTIONS FOR DRAIN RAISING PIPING** 〉

〈 **HOW TO INSTALL PIPING** 〉

(1) Connect the drain hose to the drain raising pipes, and insulate them.

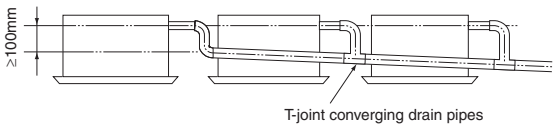
(2) Connect the drain hose to the drain outlet on the indoor unit, and tighten it with the clamp.

(3) Insulate both metal clamp and drain hose with the attached sealing pad.



	A
When canvas duct is installed	350 – 530
When air inlet panel is directly installed	275

- If converging multiple drain pipes, install according to the procedure shown below.



3P086156-3A-9

Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

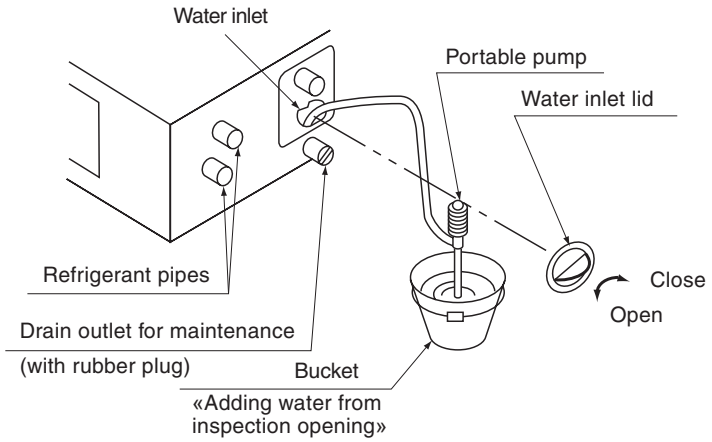
Caution

- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

3P086156-7D

(2) After piping work is finished, check drainage flows smoothly.

- Open the water inlet lid, add approximately 1 liter of water gradually and check drainage flow.



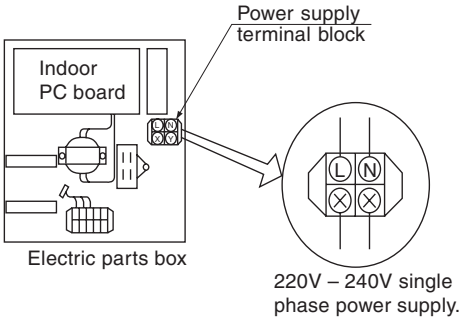
Note: Use this outlet to drain water from the drain pan.

[WHEN ELECTRIC WIRING WORK IS FINISHED]

- Check drainage flow during COOL running, explained under “TEST OPERATION”.

[WHEN ELECTRIC WIRING WORK IS NOT FINISHED]

- Remove the electric parts box lid, connect a power supply and remote control to the terminals.
  (Refer to the “HOW TO CONNECT WIRINGS”)
  Be sure attach the electric parts box lid before turning on the power.
  Next, press the inspection/ test operation button “ TEST ” on the remote control. The unit will engage the test operation mode.
  Press the operation mode selector button “ ” until selecting FAN OPERATION “ ” . Then, press the ON/OFF button “ ”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “ TEST ” to go back to the first mode.



- You can check whether drainage is satisfactory or not by removing the access opening lid and checking the water level of the drain pan through the access opening.
- **Be careful when doing so because the fan is turning at the same time.**

3P086156-7D

Ceiling Mounted Duct Type (FXMQ-MA)

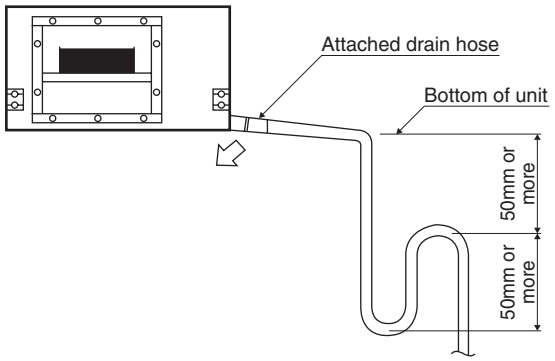
Drain Piping Work

〈〈**Rig the drain pipe as shown below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.**〉〉

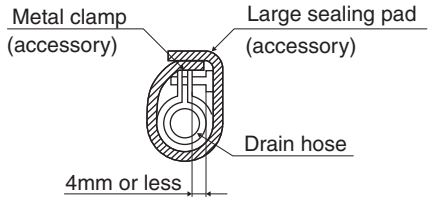
〈〈**Insulate the drain hose inside the building.**〉〉

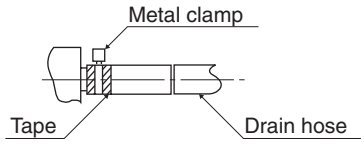
(1) Carry out the drain piping.

FXMQ40-125MAVE



- Keep piping as short as possible and slope it downwards so that air may not remained trapped inside the pipe.
- Keep pipe size equal to or greater than that of the connecting pipe (Vinyl pipe of 25 mm nominal diameter and 32 mm outer diameter).
- Use the attached drain hose and clamp.
  Tighten the clamp firmly.
- Insulate the clamp metal with the sealing pad.

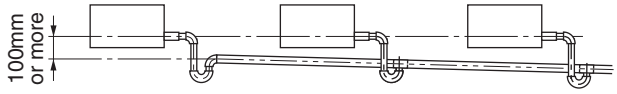




- **There is negative pressure inside the unit relative to atmospheric pressure when the unit is running, so be sure to provide drain flap on the drain outlet. (See the figure)**
- **In order to prevent foreign matter from building up inside the piping, you should avoid curves as much as possible, and arrange so the trap can be cleaned.**

Note:

- If converging multiple drain pipes, install according to the procedure shown below. (Install a drain trap for each indoor unit.)



FXMQ200 · 250MAVE

- A drain trap need not be installed.
- The diameter of the piping is the same as that of the connecting pipe (PS1B), and should be kept equal to or greater than that of the connecting pipe.

(2) After piping work is finished, check drainage flows smoothly.

FXMQ40-125MAVE

- Add approximately 1 liter of water slowly from the air inlet and check drainage flow.

FXMQ200 · 250MAVE

- Open the water supply port, add approximately 1 liter of water slowly into the drain pan and check drainage flow.

Caution

- Drain piping connections

  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.

C: 3P086156-6U

Ceiling Suspended Type (FXHQ-MA)

Drain Piping Work

Rig the drain pipe as shown below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.

(1) Carry out the drain piping.

- For drain work, rig the pipes so that they drain reliably.
- The drain pipe outlet direction can be chosen from the right rear, right, left rear, and left. Refer to "REFRIGERANT PIPING WORK" for right rear and right direction, and refer to Fig. 20 for left rear and left direction.

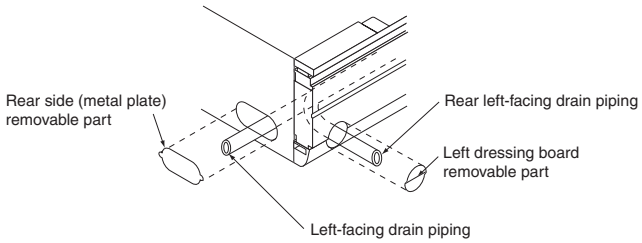


Fig. 20

- For left drain pipe outlet, remove the rubber plug and the insulation on the drain pipe connecting opening on the left side of the unit and change the position to the right side.
- Insert the rubber stopper securely, all the way to the base, in order to prevent water leakage.
- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe. (Vinyl tube; pipe size: 20 mm; outer dimension: 26 mm)
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming. **(Refer to Fig. 21)**
- Use the attached drain hose (1) and clamp (2).
  Insert the drain hose into the drain socket, up to the gray tape.**(Refer to Fig. 22)**
  Tighten the clamp until the screw head is less than 4 mm from the hose. **(Refer to Fig. 23)**
  (Be careful of the installation direction. Install so that the clamp metal does not contact the intake grill.)
- Wrap the attached sealing pad (8) over the clamp and drain hose to insulate. **(Refer to Fig. 23)**
- No folding of drain hose inside the indoor unit. **(Refer to Fig. 24)**
  (If there is slack in the drain hose, it may cause damage to the intake grill.)

3PN01417-7P

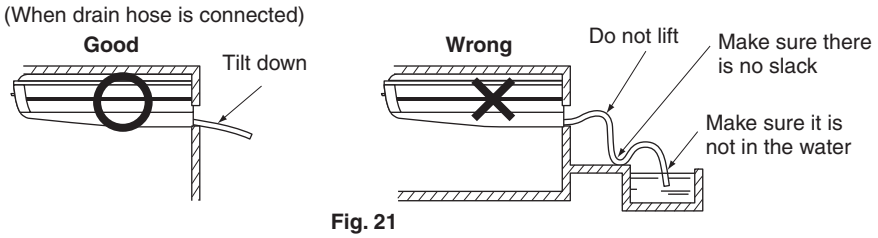


Fig. 21

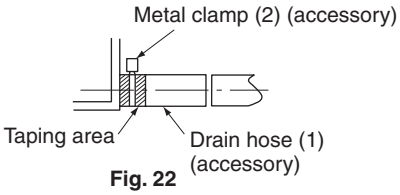


Fig. 22

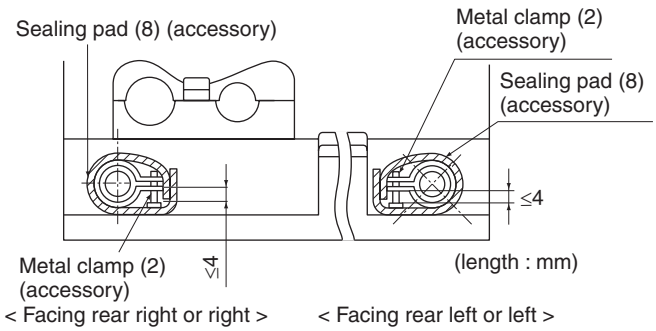
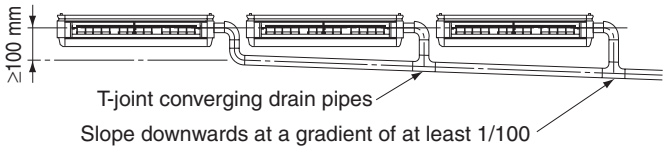


Fig. 23

Notes:

- To ensure no excessive pressure is applied to the included drain hose (1), do not bend or twist when installing. (This may cause leakage.)
- If converging multiple drain pipes, install according to the procedure shown below.



Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

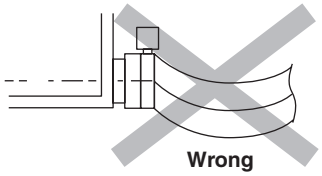


Fig. 24

(2) Confirm that smooth drainage is achieved after the piping work.

- Add 0.6 liter of water in the drain pan from the air outlet for confirming drainage. **(Refer to Fig. 25)**

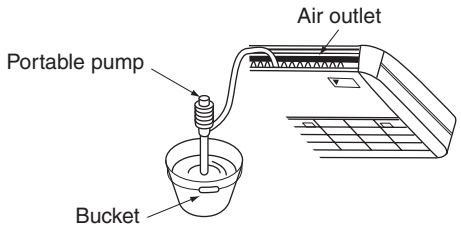


Fig. 25

Caution

- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

Wall Mounted Type (FXAQ-MA)

(1) Install the drain piping. (Refer to Fig. 16)

- The drain pipe should be short with a downward slope and should prevent air pockets from forming.
- Watch out for the points in the figure 16 when performing drain work.

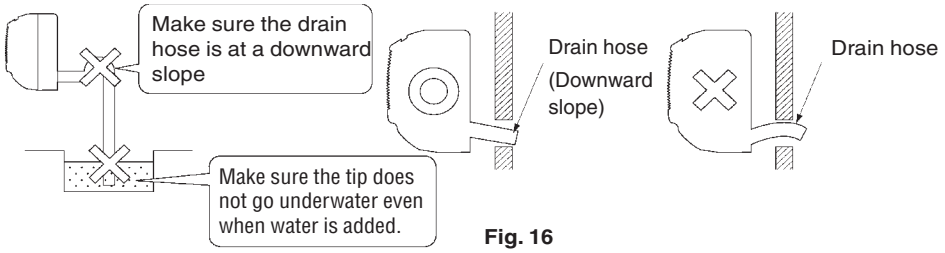


Fig. 16

- When extending the drain hose, use a commercially available drain extansion hose, and be sure to insulate the extended section of the drain hose which is indoors. **(Refer to Fig. 17)**

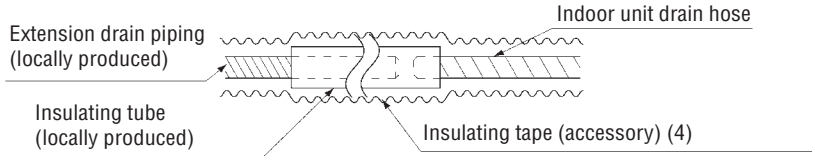


Fig. 17

- Make sure the diameter of the piping is the same as the piping (hard vinyl chloride, nominal diameter 13mm) or bigger.
- When directly connecting a hard vinyl chloride pipe joint (nominal diameter 13mm) to the drain hose connected to the indoor unit (i.e. for embedded piping, etc.), use a commercially available hard vinyl choride pipe joint (nominal diameter 13mm). **(Refer to Fig. 18)**

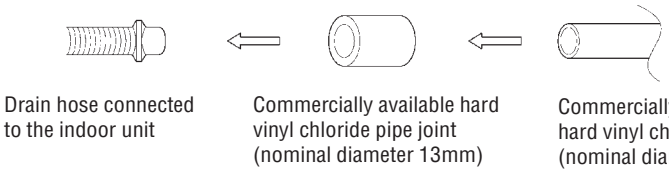


Fig. 18

(2) Make sure the drain works properly.

- After drain work is complete, perform a drain check by opening the front panel, removing the air filter, pouring water into the drain pan, and make ing sure the water flows smoothly out of the drain hose. **(Refer to Fig. 19)**

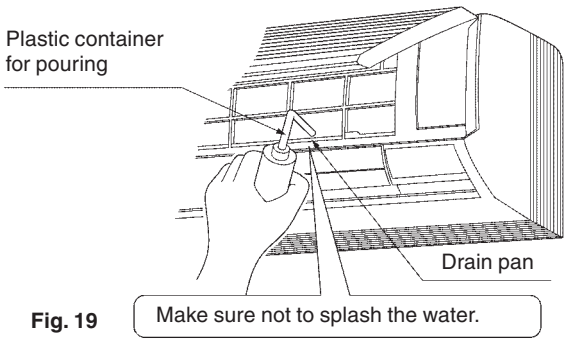


Fig. 19

Caution

Drain piping connections

Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.

Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

C: 3P156215-6D

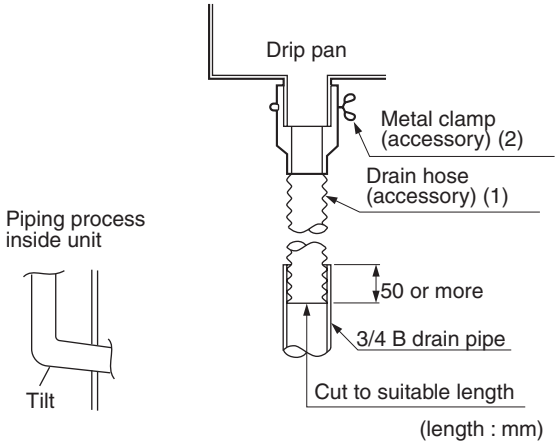
Floor Standing/ Concealed Floor Standing Type (FXLQ-MA, FXNQ-MA)

Drain Piping Work

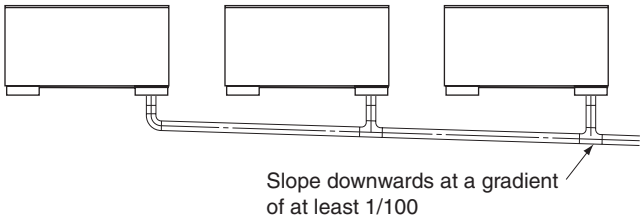
<<Rig the drain pipe as shown below and take measures against condensation. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.>>

(1) Carry out the drain piping.

Connect the drain hose (1) using the attached hose and parts, as shown in the right drawing.



- If converging multiple drain pipes, install according to the procedure shown below.



Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

(2) After piping work is finished, check drainage flows smoothly.
- Add approximately 1 liter of water slowly from the air outlet and check drainage flow.

(3) Be sure to insulate all indoor pipes.

Caution

- Drain piping connections
  Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe.

C: 3P086154-2K

Ceiling Suspended Cassette Type (FXUQ-MA)

Drain Piping Work

1. Rig drain piping (Refer to Fig. 26)

As for drain work, perform piping in such a manner that water can be drained properly.
As for drain piping, the connection can be made from three different directions.

- Employ a pipe with either the same diameter or with the diameter larger (excluding the raising section) than that of the connecting pipe (PVC pipe, nominal diameter 20 mm, outside diameter 26 mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming. **(Refer to Fig. 27)**

Caution Water pooling in the drainage piping can cause the drain to clog.

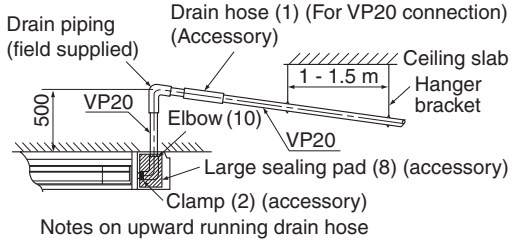


Fig. 26

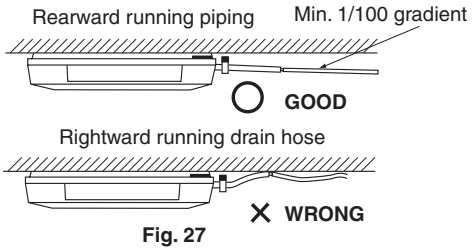


Fig. 27

(V2327)

- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m. **(Refer to Fig. 26)**
- Use only the included drain hose (1), (for rightward running drain hose) or elbow (10) (for upward running drain hose) and clamp (2).
- Fit the drain hose (1) or elbow (10) over the drain pipe up to the neck and fasten tight with the clamp (2).
- Insulate the clamp (2) and drain hose or elbow (10) with the included sealing pad (8). **(Refer to Fig. 28)**
- Make sure that heat insulation work is executed on the following 2 spots to prevent any possible water leakage due to dew condensation.
  - Insulate the drain hose inside the building.
  - Drain socket

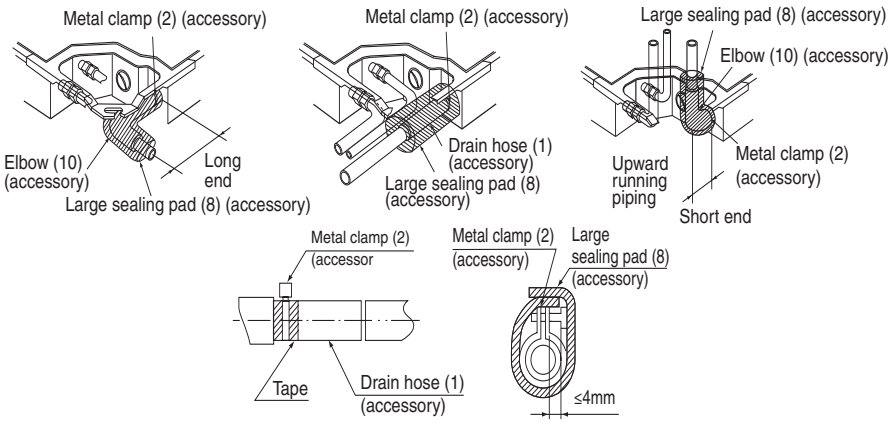


Fig. 28

Caution

- Do not twist or bend the drain hose (1), so that excessive force is not applied to it, as this could cause leaks.

- If converging multiple drain piping, install according to the procedure shown below. **(Refer to Fig. 29)**
  Select converging drain piping whose gauge is suitable for the operating capacity of the unit.

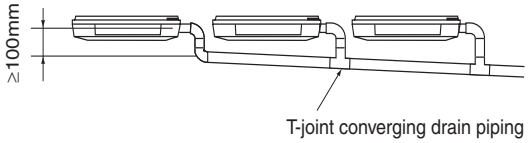
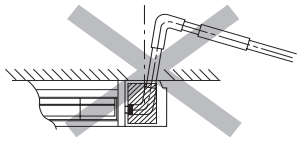


Fig. 29

PRECAUTIONS FOR UPWARD DRAIN RAISING PIPING

- Install the drain raising pipes at a height of less than 500 mm.
- Install the drain raising pipes at a right angle to the indoor unit. **(Refer to Fig. 30)**



WRONG

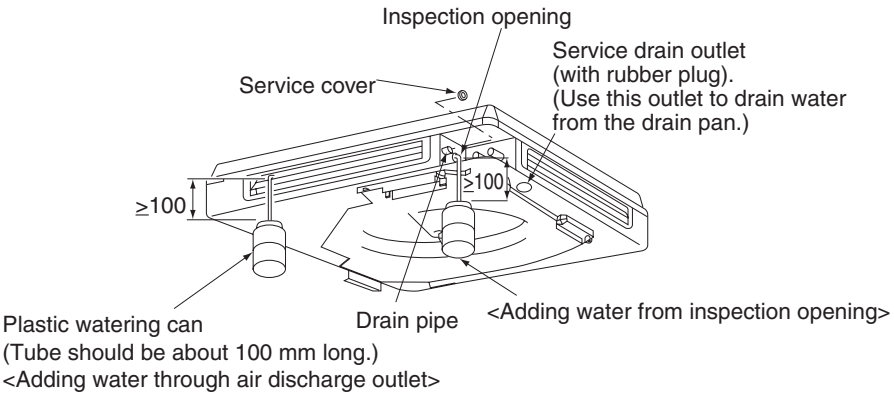
Fig.30

Caution If the upward running drain hose leans at a slant, the float switch will malfunction and water will leak.

(V2328)

2. After piping work is finished, check if drainage flows smoothly.

- Open the water inlet lid, add approximately 1 liter of water slowly and check drainage flow.
  (Refer to Fig. 31)



Method of adding water

Fig.31 (V2329)

[Caution]

Drain piping connections

- Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.

Caution

- Electrical wiring work should be done by a certified electrician.
- If someone who does not have the proper qualifications performs the work, perform the following after the test run is complete.

- Remove the control box lid and change the emergency switch above the PC board assembly of the indoor unit from “NORM.” to “EMERG.”. Connect the single-phase power supply (1, 3) and ground wire to the inter-unit wiring (50Hz 220-240V) terminal block and confirm drain operation.Be sure to change the switch before turning on the power. **(Refer to Fig. 32)**

Caution

- Clamp solidly to clamp C to tension is not added to the wiring connections.
- Be aware that the fan will turn during the operation.

- After confirming drainage, turn off the power and be sure to change the emergency switch back to “NORM.”.

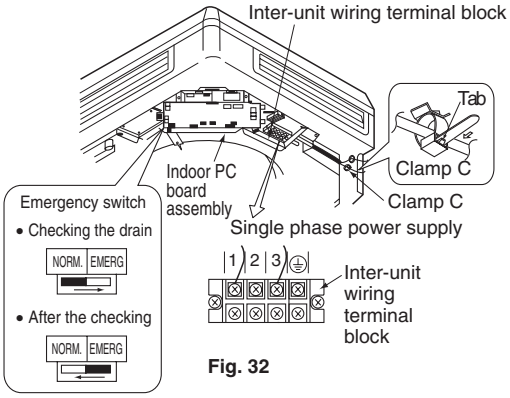


Fig. 32

(V2330)

Outdoor Air Processing Unit (FXMQ-MF)

Drain Piping Work

<<Rig the drain pipe as shown below and take measures against condensate. Improperly rigged piping could lead to leaks and eventually wet furniture and belongings.>>
<<Insulate the drain pipes inside the building and the drain sockets.>>

1. Carry out the drain piping.

- The drain pipe should be short with a downward slope lower than 1/100 and should prevent air pockets from forming.
- The diameter of the pipe is the same as that of the connecting pipe (PS1B), and should be kept equal to or greater than that of the connecting pipe.

Note:

- If converging multiple drain pipes, install according to the procedure shown below. (Select an appropriate central drain pipe thickness for the units they will be connected to.)

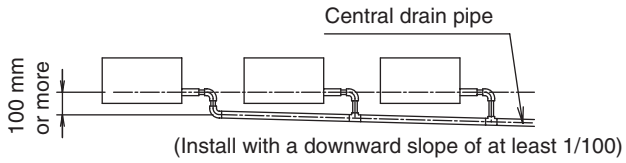


Fig. 12

2. After piping work is finished, check drainage flow smoothly.

- Open the water supply port, add approximately 1 liter of water slowly into the drain pan and check drainage flow. **(Refer to Fig. 13)**
  Pools of drainage can cause the drain pipes to clog.

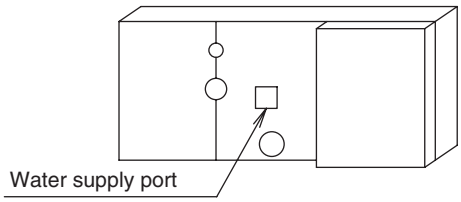


Fig. 13

Caution Do not connect the drain pipe directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the unit through the drain pipes and corrode the heat exchanger.

3.2.10 Electrical Work

Control Wiring

1. Compatible types of wire

Wiring Specifications

Wiring Type	Shield Wire (2 wire) (See NOTE 1, 2)
Size	0.75~1.25 mm²

Notes:

1. Sheathed wire may be used for transmission wirings, but they do not comply with EMI (Electromagnetic Interference) (EN55014). When using sheathed wire. EMI must conform to Japanese standards stipulated in the Electric Appliance Regulatory Act. (If using a sheathed wire, the grounding shown in the figure on the left is unnecessary.)
2. For FXYAP indoor unit, use sheathed wire.

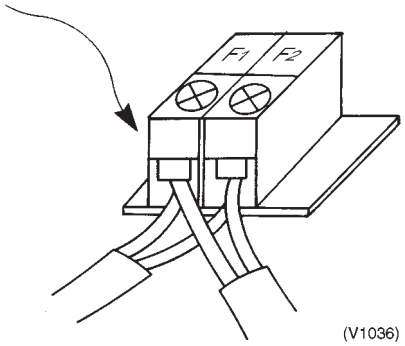
2. Problems arising from the use of unsuitable cable

a) When cable less than 0.75 mm² is used

Where the control wiring is particularly long the transmission signals may, for example, become unstable and the terminal relay cease to function. (Reduced voltage) The control system may become unduly subject to noise interference.

b) When cable more than 1.25 mm² is used

When wiring indoor units together, the terminal block will not be able to accommodate 2 cables simultaneously if the cables are larger than 1.25 mm².

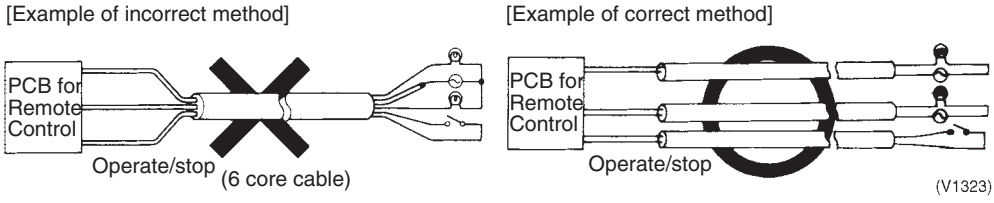


c) For multi-core cable

The greater play between wires, the more the transmitted wave is distorted and transmission destabilized.

d) In the case of a remote control with a three way selector for cooling, heating and ventilation, twin core cable should be used when the ventilation mode is not required and three core cable should be used when three way selection is required.

e) Since there is a considerable risk of mixing high (220 to 240V) and low voltage in the case of, for example, a PCB for remote control, multiple core cable must not be used. (Internal wiring regulations and dielectric strengths of cables are relevant here.)



f) Other important points

1. The refrigerant circuit and the indoor/outdoor connecting cables must correspond exactly.
2. A suitable gap must be left between the control cables and the power supply cables where these are laid alongside each other. (See “Separation of control and power supply cables” on page 73)

Power Supply (Cabling of Main Power Supply)

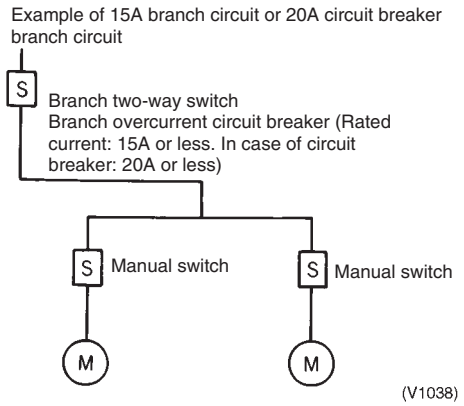
1. Choosing a circuit breaker

The power supply work must conform to local regulations. In Japan, the relevant regulations are the MITI ordinance determining technical standards for electrical equipment, and the Internal Wining Provisions.

a) The indoor unit circuit breakers

- In accordance with the provisions for internal wiring (JEAC8001-1986), power may be supplied by means of crossover lines between the indoor units in a single system branch circuit.

Branch circuit facility (Internal wiring provisions 305-2)
The motors must be set up with a dedicated branch circuit for each unit. However, where they correspond to any of the following situations, this limitation does not apply.
① When used in a 15A branch circuit of a 20A circuit breaker branch circuit
Note: It is recommended that the total rated capacity of the motors set up in a 15A branch circuit or a 20A circuit breaker branch circuit should be no more than 2.2kW.



When using high static pressure indoor units the fan motors must have a large capacity. Single phase 220~240V branch circuits are therefore required for each indoor unit.

Example: Up to 10 × 2.5HP indoor units or 5 × 5HP indoor units can be wired together.

b) The outdoor unit circuit breaker

- A separate circuit breaker must be fitted for each unit.
- The motors incorporated into air conditioning system compressors are treated as special motors under the internal wiring provisions. The values which apply to normal motors are thus somewhat variance with those which apply to such compressor motors. You are recommended to adhere strictly to the procedures laid down in the technical materials included in, for example, the system design manuals.

Calculation of load (Refer to local regulation.)

With respect to the calculation of load for motors with special applications such as elevator, air conditioner and refrigerator motors, not only must the rated current be shown on the name plate of the said motor or piece of apparatus but it must also included all special characteristics or applications.

Note1: The rated current for package air conditioners which use special purpose built-in compressor motors in their compressors in 1.2 times the operating current shown on the name plate.

Note2: Refer 1.7 (or 2.7) Field Wiring on each installation manual for detail power supply and circuit breaker.

2. Cable size

The thickness of the cables in the circuits (branch circuits) providing the main power supply to each item of apparatus must satisfy the following conditions:

1. To have a current tolerance of 40% or more of the rated current of the overcurrent circuit breaker (wiring circuit breaker, etc.).
2. To have a current tolerance of 125% or more of the rated current in cases where the rated current of the apparatus is 50A or less.
3. To have a current tolerance of 110% or more of the rated current in cases where the rated current of the apparatus is more than 50A.
4. To satisfy voltage drop standards.

3. Separation of control and power supply cables

- **If control and power cables are run alongside each other** then there is a strong likelihood of operational faults developing due to interference in the signal wiring caused by electrostatic and electromagnetic coupling.
  The table below indicates our recommendations as to the appropriate spacing of control and power cables **where these are to be run side by side.**

Current capacity of power cable		Spacing
100V or more	10A or less	300mm
	50A	500mm
	100A	1000mm
	100A or more	1500mm

Notes:

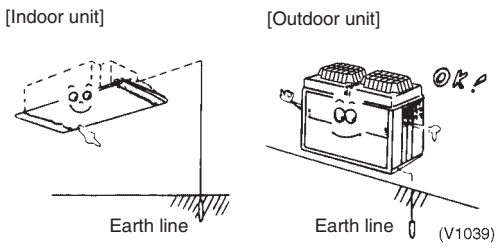
1. The figures are based on an assumed length of parallel cabling up to 100m. For lengths in excess of 100m the figures will have to be recalculated in direct proportion to the additional length of cable involved.
2. If the power supply waveform continues to exhibit some distortion the recommended spacing in the table should be increased.

If the cables are laid inside conduits then the following points must also be taken into account when grouping various cables together for introduction into the conduits.

1. Power cables (including power supply to the air conditioner) and signal cables must not be laid inside the same conduit. (Power cables and signal cables must each have their own individual conduits.)
2. In the same way, when grouping the cables, power and signal cables should not be bunched together.

- **Important points**

1. Earthing

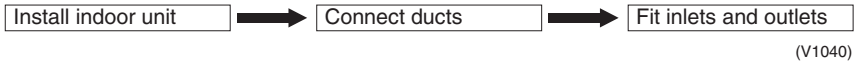


- Have the indoor and outdoor units both been earthed?

* If the apparatus is not properly earthed then there is always a risk of electric shocks. The earthing of the apparatus must be carried out by a qualified person.

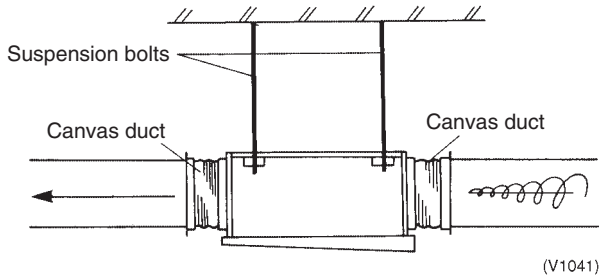
3.2.11 Duct Work (Indoor)

■ **Operational steps**



Taking Account of Noise and Vibration

a) Canvas joints must be used between the main unit and the air suction and discharge ducts. These fittings are designed to inhibit secondary noise resulting from the transmission of vibrations and operating noise from the main unit to the ducts or to the rest of the building.



b) The speed of the airflow should be taken into account when choosing air suction and distribution grills in order to keep wind noise to minimum.

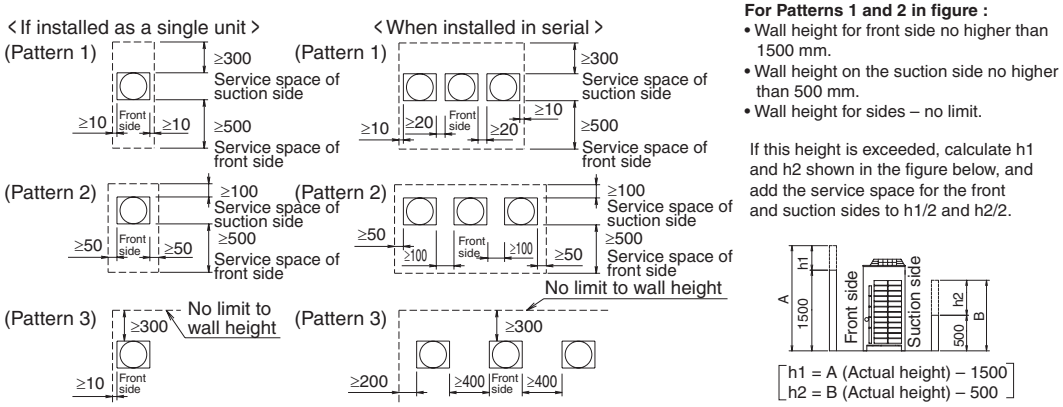
■ **Important points**

1. The air discharge duct must be thermally insulated.
2. The canvas duct on the inlet side must be set in a metal framework.
3. The air suction and distribution grills should be positioned to take into account the possibility of short circuits.
4. Static pressure should be checked to ensure that the airflow is within the specified range.
5. The air filter must be easily detachable.

3.2.12 Selection of Location

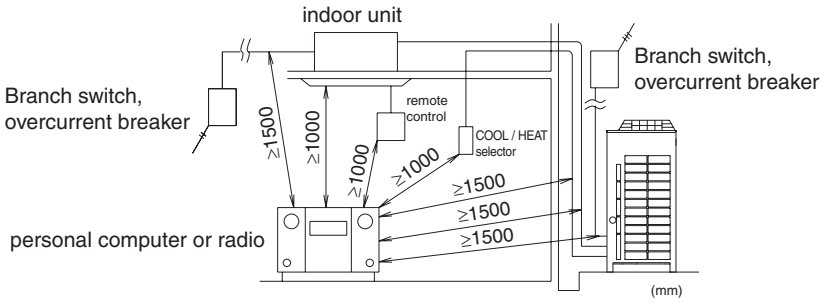
This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment. If installed as a household appliance it could cause electromagnetic interference. The VRV outdoor units should be installed in a location that meets the following requirements:

1. The foundation is strong enough to support the weight of the unit and the floor is flat to prevent vibration and noise generation.
2. The space around the unit is adequate for servicing and the minimum space for air inlet and air outlet is available. (Refer to below figure and choose one of both possibilities.)
3. There is no danger of fire due to leakage of inflammable gas.
4. Ensure that water cannot cause any damage to the location in case it drips out the unit (e.g. in case of a blocked drain pipe).
5. The piping length between the outdoor unit and the indoor unit may not exceed the allowable piping length. (See “Example of connection”.)
6. Select the location of the unit in such a way that neither the discharged air nor the sound generated by the unit disturb anyone.
7. Make sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a windscreen to block the wind.



Caution

1. An inverter air conditioner may cause electronic noise generated from AM broadcasting. Examine where to install the main air conditioner and electric wires, keeping proper distances away from stereo equipment, personal computers, etc.

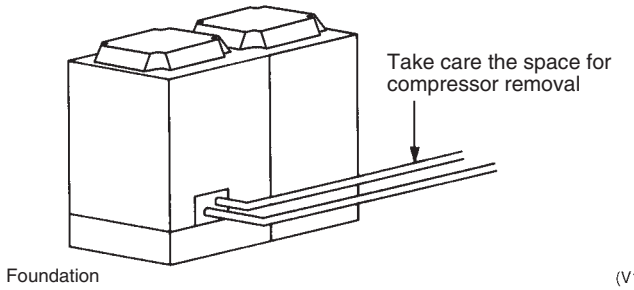


If the electric wave of AM broadcasting is particularly weak, keep distances of 3m or more and use conduit tubes for power and transmission lines.

2. In heavy snowfall areas, select an installation site where snow will not affect operation of the unit.
3. If condensate may drip on downstairs (walkway) depending on the floor condition, take a measure such as the installation of central drain pan kit (sold separately).
4. The refrigerant R-410A itself is nontoxic, nonflammable and is safe. If the refrigerant should leak however, its concentration may exceed the allowable limit depending on room size. Due to this it could be necessary to take measures against leakage. Refer to the chapter “Caution for refrigerant leaks”.

Service Space

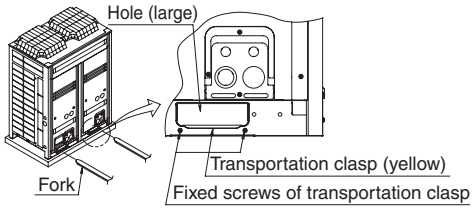
It is extremely important that enough space is left when installing the equipment to allow routine servicing and maintenance to be carried out without undue hindrance. It is particularly important to bear in mind the work which will be required if the compressor needs to be replaced. (The layout of the pipework can sometimes cause considerable difficulties if the compressor needs to be changed.)



3.2.13 Inspecting and Handling the Unit

- At delivery, the package should be checked and any damage should be reported immediately to the carrier claims agent.
- When handling the unit, take into account the following:

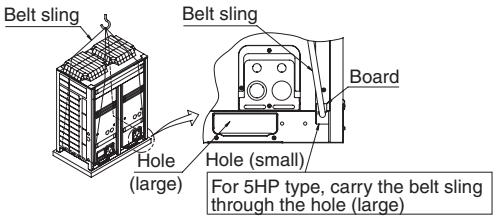
1. Fragile, handle the unit with care.
   Keep the unit upright in order to avoid compressor damage.
2. Decide on the transportation route.
3. If a forklift is to be used, pass the forklift arms through the large openings on the bottom of the unit.



4. If hanging the unit, use a cloth sling to prevent damaging the unit when hanging it. Keeping the following points in mind, hang the unit following the procedure shown in figure 6.

- Use a sling sufficiently strong to hold the mass of the unit.
- Use 2 belts of at least 8m long.
- Place extra cloth or boards in the locations where the casing comes in contact with the sling to prevent damage.
- Hoist the unit making sure it is being lifted at its center of gravity.

5. After installation, remove the transportation clasp attached to the large openings.



Notes:

- Use belt sling of 20mm width or less which adequately bears the weight of the product.
- Apply a filler cloth on a fork to prevent coating of the bottom frame from coming off and rust from occurring when bringing in the unit with anti-corrosion treatment type using a forklift.

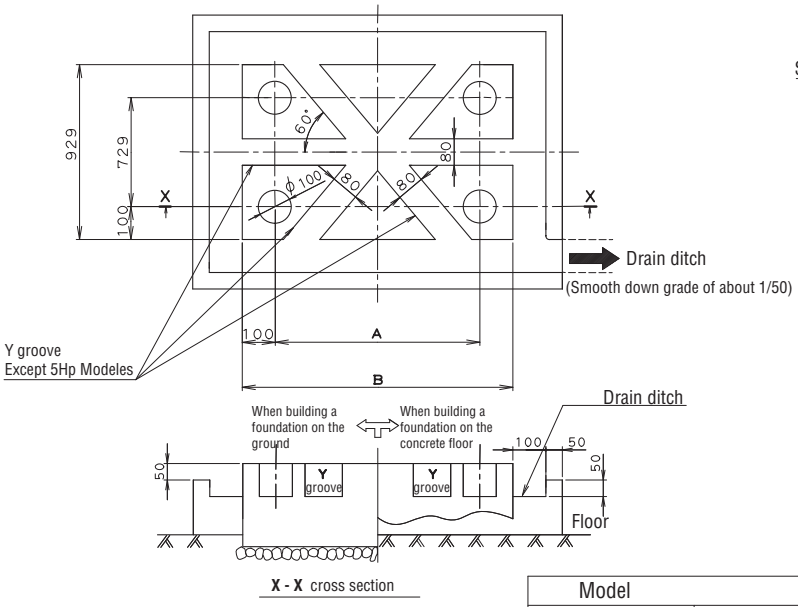
3.2.14 Installation of Outdoor Unit

■ **Operational steps**

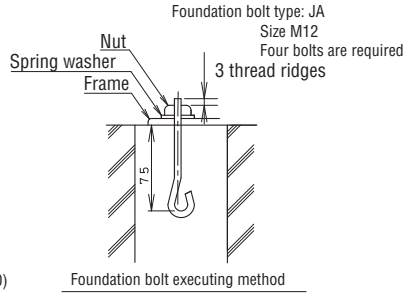
Prepare foundation → Install outdoor unit

(V1150)

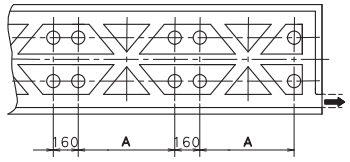
Foundation of Units



X - X cross section



Foundation bolt executing method



When installing multiple units in connection

Model		A	B
5HP	RX(Y)Q5PY1, YL	497	697
8.10HP	Q8•10PY1, YL	792	992
12•14•16•18HP	RX(Y)Q12•14•16•18PY1, YL	1 102	1302

C:3D040102P

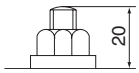
Notes:

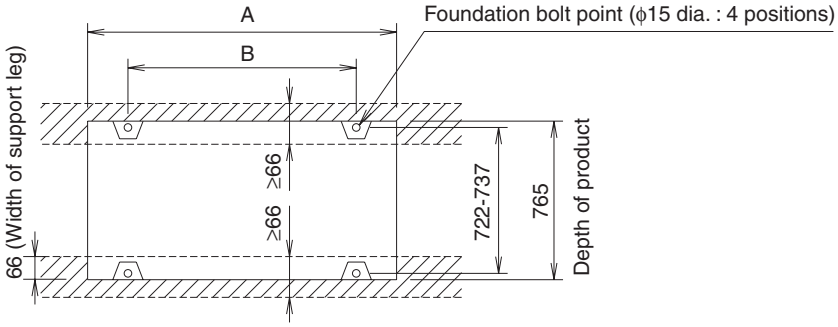
1. The proportions of cement : sand : gravel for the concrete shall be 1 : 2 : 4, and ten reinforcement bars that their diameter are 10mm, (approx. 300mm intervals) shall be placed.
2. The surface shall be finished with mortar. The corner edges shall be chamfered.
3. When the foundation is built on a concrete floor, rubble is not necessary. However, the surface of the section on which the foundation is built shall have rough finish.
4. A drain ditch shall be made around the foundation to thoroughly drain water from the equipment installation area.
5. When installing the equipment on a roof, the floor strength shall be checked, and water-proofing measures shall be taken.
6. Y groove unnecessary for 5HP Models.
7. When selecting the piping from the bottom, provide the height 200mm or more from a base.

Unpacking and Placing the Unit

Bolt Pitch

- Make sure the unit is installed level on a sufficiently strong base to prevent vibration and noise.
- Secure the unit to its base using foundation bolts. (Use four commercially available M12-type foundation bolts, nuts, and washers.)
- The foundation bolts should be inserted 20 mm.
- Make sure the base under the unit extended more than 765mm behind the unit.
- The height of the base should be at least 150mm from the floor.
- The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete) as indicated in figure.



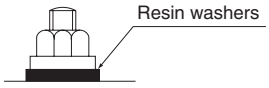


Shape of outdoor unit's support leg and foundation bolt positions

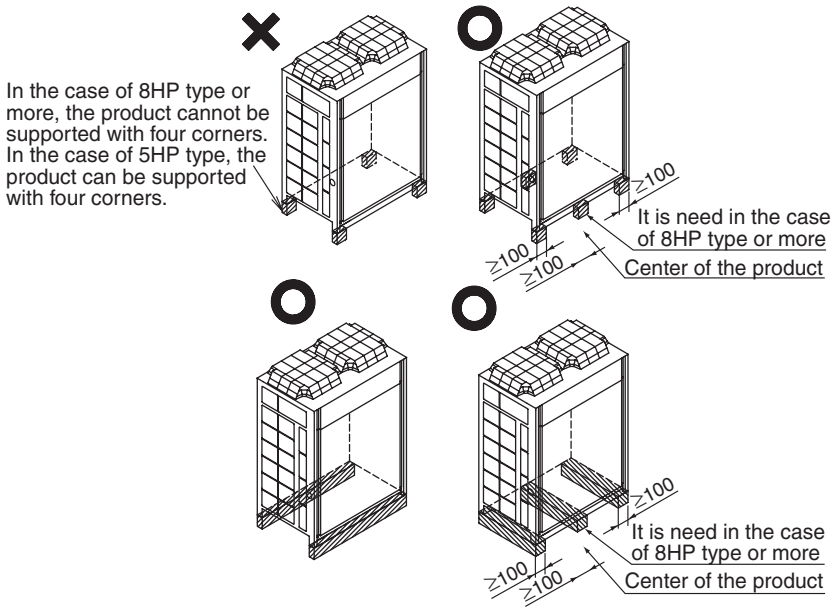
Model		A	B
5HP	RX(Y)Q5PY1, YL	635	497
8.10HP	RX(Y)Q8•10PY1, YL	930	792
12•14•16•18HP	RX(Y)Q12•14•16•18PY1, YL	1240	1102

Notes:

1. When installing on a roof, make sure the roof floor is strong enough and be sure to water-proof all work.
2. Make sure the area around the machine drains properly by setting up drainage grooves around the foundation.
   Drain water is sometimes discharged from the outdoor unit when it is running.
3. For anti-corrosion type use nuts with resin washers. If the paint on nut connections comes off, the anti-corrosion effect may decrease.



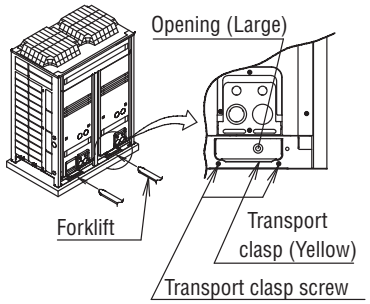
Do not Use Stands to Support The Corners



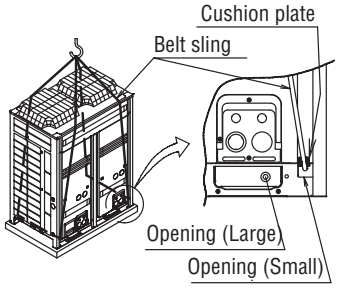
Caution Caution label

To Installers

1. When carrying the unit
- If a forklift is used for carrying the unit, put the forklift arms into the large openings on the bottom of the unit.
  - ※ In order not to damage the coating of the bottom frame, put rags on the forklift arms. (Otherwise rustproofing effect will be lost)
- After installation, remove the transport claps attached to the large openings.



2. When lifting the unit
- Put the belt slings into the small openings.
  (For 5HP unit, into the large openings)
- Lift the unit with 2 belts of at least 8m long.
- Put cushioning plates or rags where the slings contact the casing.



3. Electrical work
- To prevent electric shock and fire accident, be sure to perform grounding and install an earth leak breaker.
- Electrical work must be carried out by a licensed electrician in accordance with local and national regulations.

3P170269B

To Service Person

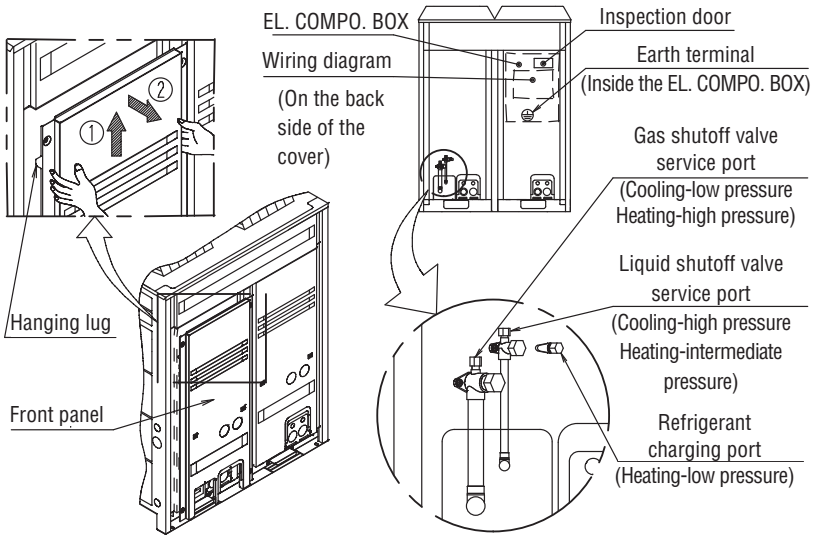
⚠WARNING | ⚠ Caution to electric shock

- Beware the fan running when inspect.
- Do not touch the charged parts when inspect

Check the system status on LED(H2P) on the Pc board (A1P) from inspection door on the EL, COMPO, BOX cover･
LED display shows:
TURNING OFF***Normal TURNING ON***Abnormal
FLASHING***Under preparation
(For multi system, check the PC board of the master unit. The master unit is the outdoor unit connected to the transmission wiring to the indoor units.)

To ALL handlers

- For removing the front panel, lift the panel a little (①), and pull the panel towards you (②).
- For the location of the EL, COMPO. BOX and the service port, see as shown below on the right.

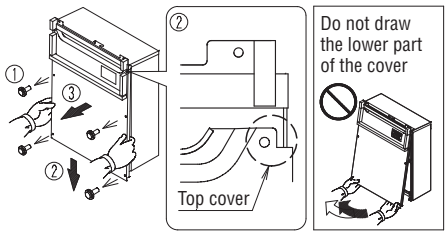


3P170269B

CAUTION for removing and installing the EL. COMPO. BOX cover

Method of removal

① Remove the 4 screws fixing the cover.
② Pull the cover downward till its top shows.
③ Pull the cover frontward and remove it.

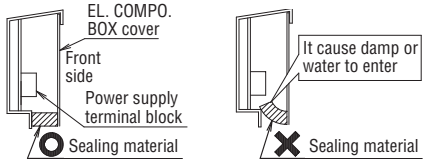


Method of installation

For installing the cover, follow the procedures in the reverse order.

CAUTION

- Do not remove the cover by force. If the cover is deformed, water may enter inside, wich may cause failure.
- Install the cover so that the sealing material labeled on the lower part on its back side may not get caught in the EL. COMPO. BOX inside. (See as shown below)



⚠WARNING | ⚠ Caution to electric shock

Shut off the power supply before removing the cover.
If your fingers thouch the electrical components it may cause electric shock.

3P173367B

4. Test Operation

4.1 Procedure and Outline

Follow the following procedure to conduct the initial test operation after installation.

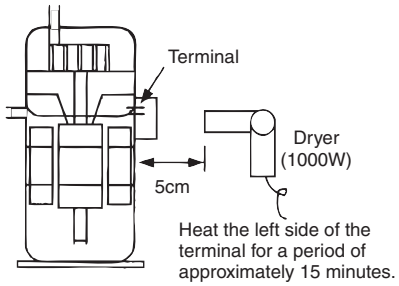
4.1.1 Check Work Prior to Turn Power Supply On

Check the below items.
- Power wiring
- Control transmission wiring between units
- Earth wire

⇩

○ Is the wiring performed as specified?
○ Is the designated wire used?
○ Is the wiring screw of wiring not loose?
○ Is the grounding work completed?
○ Is the insulation of the main power supply circuit deteriorated?
Use a 500V megger tester to measure the insulation. (*1)
- Do not use a megger tester for other circuits than 200V (or 240V) circuit.

*1:Measure to be taken against decreased insulation resistance in the compressor
If the compressor is left to stand for an extended period of time after the refrigerant charge with the stop valve open and the power supply OFF, the refrigerant may be mixed in the compressor, thus decreasing the insulation resistance.
Heat the compressor as shown on the right and then recheck the insulation.



Check on refrigerant piping / insulation materials

⇩

○ Is the pipe size proper?
○ Is the pipe insulation material installed securely?
Liquid and gas pipes need to be insulated. (Otherwise causes water leak.)

Check airtight test and vacuum drying.

⇩

○ Have the airtight test and the vacuum drying been conducted according to the procedure in the Installation Manual?

Check on amount of refrigerant charge

⇩

○ Is a proper quantity of refrigerant changed?
Calculate the “additional charging amount” using “How to calculate the additional refrigerant to be charged” in “2-6-5 Example of connection”.
If the “additional charging amount” was not charged fully, charge proper amount of refrigerant.

Check the stop valves for conditions.

○ Check to be sure the stop valves are under the following conditions.

Liquid-side stop valve	Gas-side stop valve
Open	Open

4.1.2 Turn Power On

Turn outdoor unit and indoor unit power on.

⇩

Check the LED display of the outdoor unit PC board.

⇩

Make field settings with outdoor unit PC board.

⇩

Conduct check operations.

⇩

Check for normal operation.

○ Be sure to turn the power on 6 hours before starting operation to protect compressors. (to power on clankcase heater)

○ Check to be sure the transmission is normal.
The transmission is normal if the LEDs display conditions as shown in table below.

LED display ○ ON ● OFF ◑ Blinking

LED display (Default status before delivery)		Micro-computer operation monitor	MODE	TEST	COOL / HEAT select			Low noise	Demand	Multi
					IND	MASTER	SLAVE			
		HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
One outdoor unit installed		◑	●	●	○	●	●	●	●	●
When multiple outdoor unit installed (*)	Master	◑	●	●	○	●	●	●	●	○
	Slave 1	◑	●	●	●	●	●	●	●	◑
	Slave 2	◑	●	●	●	●	●	●	●	●

(*) The master unit is the outdoor unit to which the transmission wiring for the indoor units is conncted.
The other outdoor units are slave units.

○ Make field settings if needed.
(For the setting procedure, refer to information in "4.4.2. Field Setting from Outdoor Unit" on page 101 onward.)
For the outdoor-multi system, make field settings with the master unit. (Field settings made with the slave unit will be all invalid.)

The check operations shown below will be automatically initiated.
- Check for erroneous wirings
- Check for failure to open stop valves
- Check for excessive refrigerant refilling
- Automatic judgment of piping length

○ Before starting the normal operation after the completion of check operations, make sure indoor and outdoor units normally operate.

4.1.3 Check Operation

[Check Operation Procedure]

STEP1 Make the onsite setting as needed using the dip switches on the outdoor unit PC-board (A1P) with the power off (See below instruction Note1)

STEP2 Close the EL. COMPO. BOX lid and all front panels except as the side of the EL. COMPO. BOX and turn on the power to the outdoor unit and all connected indoor units. (Be sure to turn the power on at least 6 hours before operation in order to have power running to the crank case heater.)

STEP3 Check the LED display on the outdoor unit PC-board (A1P) is as shown in the table below and transmission is normal.

LED display (Default status of shipped)		SERV. MONI-TOR	MODE	TEST/ HWL	C/H SELECTOR			L.N.O.P	DEMA-ND	MULTI
					IND	MASTER	SLAVE			
		HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
Single system		◑	●	●	☼	●	●	●	●	●
Multi system (*)	Master unit	◑	●	●	☼	●	●	●	●	☼
	Sub unit 1	◑	●	●	●	●	●	●	●	◑
	Sub unit 2	◑	●	●	●	●	●	●	●	●

LED display: ●...OFF, ☼...ON, ◑...Blinking

(*)How to distinguish the master unit, sub unit 1, and sub unit 2 in the multi system.

Method 1: By the H8P (MULTI) LED display

☼ (ON): Master unit	◑ (Blinking): Sub unit 1	● (OFF): Sub unit 2

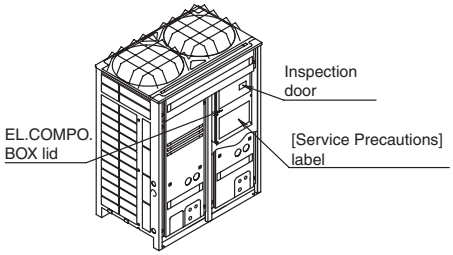
Method 2: By the transmission wiring to indoor unit

Transmission wiring is connected: Master unit
Transmission wiring is not connected : Sub unit 1 or Sub unit 2

STEP4 Make the onsite settings as needed using the push button (BS1-BS5) on the outdoor unit PC-board (A1P) with the power on. (See “4.4.2 Field Setting from Outdoor Unit.”)

STEP5 Perform the check operation following the Check Operation Method of the [Service Precautions] label on the EL. COMPO. BOX lid. The system operation for about 40 minutes and automatically stops the check operation.
If the malfunction code is not displayed in the remote control after the system stop, check operation is completed. Normal operation will be possible after 5 minutes. If the malfunction code is displayed in the remote control, correct the malfunction following [remote control displays malfunction code] and perform the check operation again.

Note1: Onsite Settings with the Power Off
If the COOL/HEAT selector was connected to the outdoor unit set the dip switch (DS1) on the outdoor unit PC-board (A1P) to “ON” (it is set to “OFF” when shipped from the factory).
For the position of the dip switch (DS1), see the “Service Precautions” label (see at right) which is attached to the EL. COMPO. BOX lid.



[remote control displays malfunction code]

Malfunction code	Installation error	Remedial action
E3, E4 F3, F6 UF	The shutoff valve of the outdoor unit is left closed.	Open the shutoff valve.
U1	The phases of the power to the outdoor unit is reversed.	Exchange two of the three phases (L1, L2, L3) to make a proper connection.
U1 U4 LC	No power is supplied to an outdoor or indoor unit (including phase interruption).	Make sure the power source wire is properly connected to the outdoor unit and revise if necessary.
UF	There is conflict on the connection of transmission wiring in the system.	Check if the refrigerant piping line and the transmission wiring are consistent with each other.
E3 F6 UF	Refrigerant overcharge.	Recalculate the additional amount refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
E4 F3	Insufficient refrigerant.	• Check if the additional refrigerant charge has been finished correctly. • Recalculate the additional amount refrigerant from the piping length and add the adequate amount.
U7, U4 UF, UH	If the outdoor unit terminal is connected when there is one outdoor unit installed.	Remove the line from the outdoor multi terminals (Q1 and Q2).

If any malfunction codes other than the above are displayed, check the service manual for how to respond.

4.2 Operation when Power is Turned On

4.2.1 When Turning On Power First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address (indoor-outdoor address, etc.).

Status

Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Indoor unit	If ON button is pushed during operation described above, the "UH" malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

4.2.2 When Turning On Power the Second Time and Subsequent

Tap the RESET button on the outdoor unit PC board. Operation becomes possible for about 2 minutes. If you do not push the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

Status

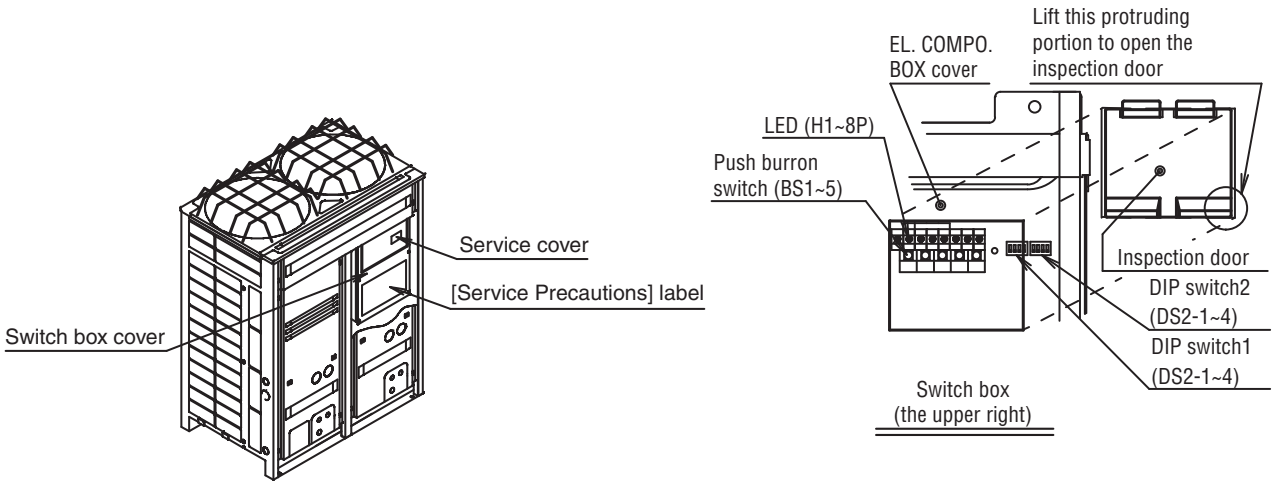
Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Indoor unit	If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

4.2.3 When an Indoor Unit or Outdoor Unit has been Added, or Indoor or Outdoor Unit PC Board has been Changed

Be sure to push and hold the RESET button for 5 seconds. If not, the addition cannot be recognized. In this case, the unit cannot be run for up to 12 minutes to automatically set the address (indoor-outdoor address, etc.)

Status

Outdoor unit	Test lamp H2P .... ON Can also be set during operation described above.
Indoor unit	If ON button is pushed during operation described above, the "UH" or "U4" malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

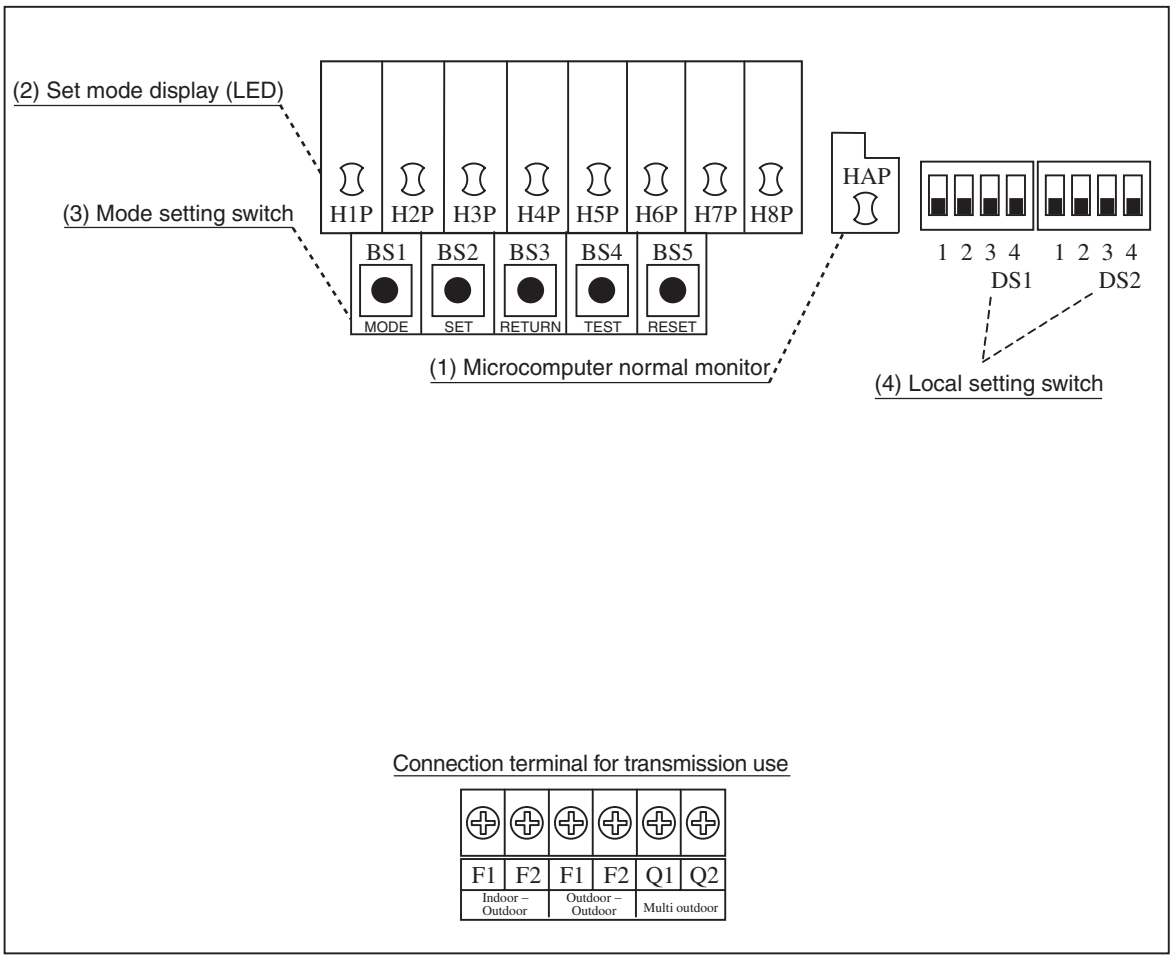


Caution When the 400 volt power supply is applyed to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

4.3 Outdoor Unit PC Board Layout

Outdoor unit PC board



(V3054)

(1) Microcomputer normal monitor.
This monitor blinks while in normal operation, and turns on or off when a malfunction occurs.

(2) Set mode display (LED).
LEDs display mode according to the setting.

(3) Mode setting switchUsed to change mode.

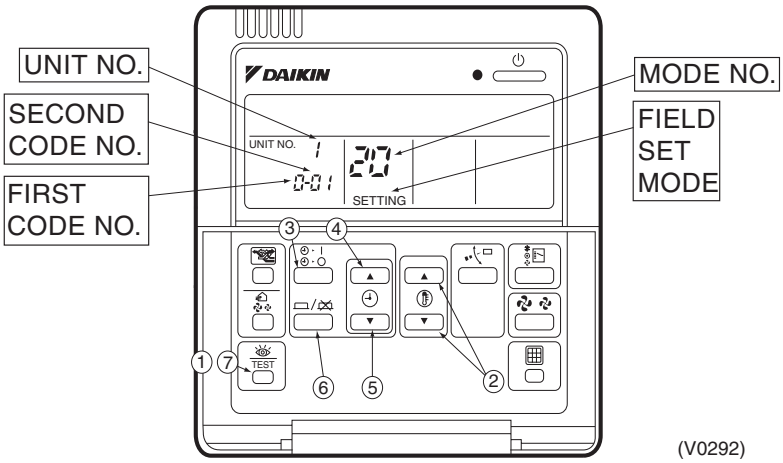
(4) Local setting switch.
Used to make field settings.

4.4 Field Setting

4.4.1 Field Setting from Remote Control

Individual function of indoor unit can be changed from the remote control. At the time of installation or after service inspection / repair, make the local setting in accordance with the following description.
Wrong setting may cause malfunction.
(When optional accessory is mounted on the indoor unit, setting for the indoor unit may be required to change. Refer to information in the option handbook.)

4.4.1.1 Wired Remote Control <BRC1C61, 62>



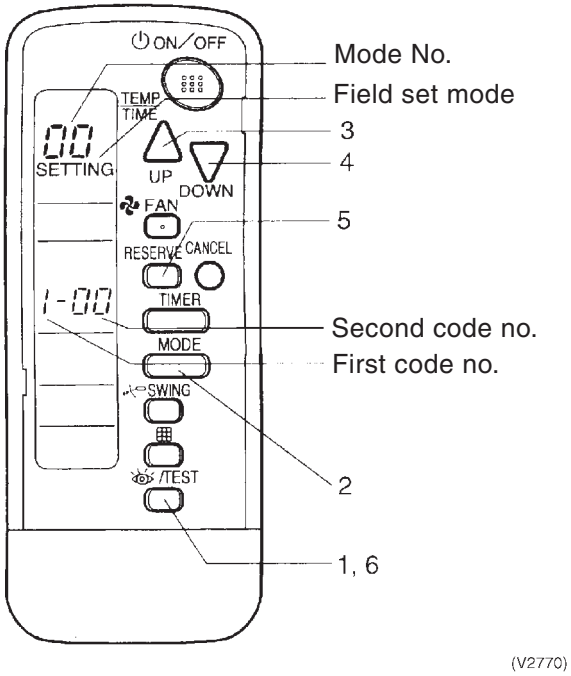
(V0292)

1. When in the normal mode, press the " TEST " button for a minimum of four seconds, and the FIELD SET MODE is entered.
2. Select the desired MODE NO. with the " " button (②).
3. During group control, when setting by each indoor unit (mode No. 20, 22 and 23 have been selected), push the " " button (③) and select the INDOOR UNIT NO to be set. (This operation is unnecessary when setting by group.)
4. Push the " " upper button (④) and select FIRST CODE NO.
5. Push the " " lower button (⑤) and select the SECOND CODE NO.
6. Push the " " button (⑥) once and the present settings are SET.
7. Push the " TEST " button (⑦) to return to the NORMAL MODE.

(Example)
If during group setting and the time to clean air filter is set to FILTER CONTAMINATION, HEAVY, SET MODE NO. to "10" FIRST CODE NO. to "0", and SECOND CODE NO. to "02".

4.4.1.2 Infrared Remote Control - Indoor Unit

BRC7C type
BRC7E type
BRC4C type

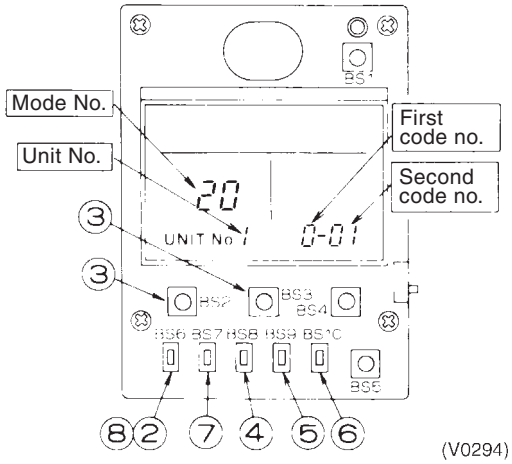


1. When in the normal mode, push the " /TEST " button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the " MODE " button.
3. Pushing the " UP " button, select the first code No.
4. Pushing the " DOWN " button, select the second code No.
5. Push the timer " RESERVE " button and check the settings.
6. Push the " /TEST " button to return to the normal mode.

(Example)
When setting the filter sign time to "Filter Dirtiness-High" in all group unit setting, set the Mode No. to "10", Mode setting No. to "0" and setting position No. to "02".

4.4.1.3 Simplified Remote Control

BRC2A51
BRC2C51



1. Remove the upper part of remote control.
2. When in the normal mode, press the [BS6] BUTTON (②) (field set), and the FIELD SET MODE is entered.
3. Select the desired MODE No. with the [BS2] BUTTON (③) (temperature setting ▲) and the [BS3] BUTTON (③) (temperature setting ▼).
4. During group control, when setting by each indoor unit (mode No. 20, 22, and 23 have been selected), push the [BS8] (④) BUTTON (unit No.) and select the INDOOR UNIT NO. to be set. (This operation is unnecessary when setting by group.)
5. Push the [BS9] BUTTON (⑤) (set A) and select FIRST CODE NO.
6. Push the [BS10] BUTTON (⑥) (set B) and select SECOND CODE NO.
7. Push the [BS7] BUTTON (⑦) (set/cancel) once and the present settings are SET.
8. Push the [BS6] BUTTON (⑧) (field set) to return to the NORMAL MODE.
9. (Example) If during group setting and the time to clean air filter is set to FILTER CONTAMINATION - HEAVY, SET MODE NO. to “10”, FIRST CODE NO. to “0”, and SECOND CODE NO. to “02”.

4.4.1.4 Setting Contents and Code No. – VRV Indoor unit

VRV system indoor unit settings	Mode No. Note 2	Setting Switch No.	Setting Contents		Second Code No.(Note 3)							
					01		02		03		04	
	10(20)	0	Filter contamination heavy/ light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Super long life filter	Light	Approx. 10,000 hrs.	Heavy	Approx. 5,000 hrs.	—		—	
				Long life filter		Approx. 2,500 hrs.		Approx. 1,250 hrs.				
				Standard filter		Approx. 200 hrs.		Approx. 100 hrs.				
		1	Long life filter type		Long life filter		Super long life filter		—		—	
		2	Thermostat sensor in remote control		Use		No use		—			
		3	Display time to clean air filter calculation (Set when filter sign is not to be displayed.)		Display		No display		—			
	12(22)	0	Optional accessories output selection (field selection of output for adapter for wiring)		Indoor unit turned ON by thermostat				Operation output		Malfunction output	
		1	ON/OFF input from outside (Set when ON/OFF is to be controlled from outside.)		Forced OFF		ON/OFF control		External protection device input		—	
		2	Thermostat differential changeover (Set when remote sensor is to be used.)		1°C		0.5°C		—		—	
		3	OFF by thermostat fan speed		LL		Set fan speed		—		—	
		4	Automatic mode differential (automatic temperature differential setting for VRV system heat recovery series cool/heat)		01:0	02:1	03:2	04:3	05:4	06:5	07:6	08:7
		5	Power failure automatic reset		Not equipped		Equipped		—		—	
	13(23)	0	High air outlet velocity (Set when installed in place with ceiling higher than 2.7 m.)		N		H		S		—	
		1	Selection of air flow direction (Set when a blocking pad kit has been installed.)		F (4 directions)		T (3 directions)		W (2 directions)		—	
		3	Air flow direction adjustment (Set at installation of decoration panel.)		Equipped		Not equipped				—	
		4	Field set air flow position setting		Draft prevention		Standard		Ceiling Soiling prevention		—	
		5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)		Standard		Optional accessory 1		Optional accessory 2		—	
	15(25)	1	Thermostat OFF excess humidity		Not equipped		Equipped		—		—	
		2	Direct duct connection (when the indoor unit and heat reclaim ventilation unit are connected by duct directly.) ∗Note 6		Not equipped		Equipped		—		—	
		3	Drain pump humidifier interlock selection		Not equipped		Equipped		—		—	
		5	Field set selection for individual ventilation setting by remote control		Not equipped		Equipped		—		—	
		6	Field set selection for individual ventilation setting by remote control		Not equipped		Equipped		—		—	

Notes:
1. Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
2. The mode numbers inside parentheses cannot be used by infrared remote controls, so they cannot be set individually. Setting changes also cannot be checked.
3. Marked ▭ are factory set.
4. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
5. “88” may be displayed to indicate the remote control is resetting when returning to the normal mode.
6. If the setting mode to “Equipped”, heat reclaim ventilation fan conducts the fan residual operation by linking to indoor unit.

4.4.1.5 Applicable range of Field setting

	Ceiling mounted cassette type			Slim Ceiling mounted duct type	Ceiling mounted built-in type	Ceiling mounted duct type	Ceiling suspended type	Wall mounted type	Floor standing type	Concealed Floor standing type	New Ceiling suspended cassette type	Outdoor air processing unit
	Multi flow	Double flow	Corner type									
	FXFQ	FXCQ	FXKQ	FXDQ	FXSQ	FXMQ	FXHQ	FXAQ	FXLQ	FXNQ	FXUQ	FXMQ-MF
Filter sign	○	○	○	○	○	○	○	○	○	○	○	○
Ultra long life filter sign	○	○	—	—	—	—	—	—	—	—	—	—
remote control thermostat sensor	○	○	○	○	○	○	○	○	○	○	○	—
Set fan speed when thermostat OFF	○	○	○	○	○	○	○	○	○	○	○	—
Air flow adjustment Ceiling height	○	—	—	—	—	—	○	—	—	—	○	—
Air flow direction	○	—	—	—	—	—	—	—	—	—	○	—
Air flow direction adjustment (Down flow operation)	—	—	○	—	—	—	—	—	—	—	—	—
Air flow direction adjustment range	○	○	○	—	—	—	—	—	—	—	—	—
Field set fan speed selection	○	—	—	○∗1	—	—	○	—	—	—	—	—
Discharge air temp. (Cooling)	—	—	—	—	—	—	—	—	—	—	—	○
Discharge air temp. (Heating)	—	—	—	—	—	—	—	—	—	—	—	○

∗1 Static pressure selection

4.4.1.6 Detailed Explanation of Setting Modes

Filter Sign Setting

If switching the filter sign ON time, set as given in the table below.

Set Time

Filter Specs. / Setting	Standard	Long Life	Ultra Long Life Filter
Contamination Light	200 hrs.	2,500 hrs.	10,000 hrs.
Contamination Heavy	100 hrs.	1,250 hrs.	5,000 hrs.

Ultra-Long-Life Filter Sign Setting

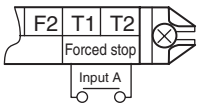
When a Ultra-long-life filter is installed, the filter sign timer setting must be changed.

Setting Table

Mode No.	Setting Switch No.	Setting Position No.	Setting
10 (20)	1	01	Long-Life Filter
		02	Ultra-Long-Life Filter (1)
		03	—

External ON/OFF input

This input is used for "ON / OFF operation" and "Protection device input" from the outside. The input is performed from the T1-T1 terminal of the operation terminal block (X1A) in the electric component box.



Setting Table

Mode No.	Setting Switch No.	Setting Position No.	Operation by input of the signal A
12 (22)	1	01	ON: Forced stop (prohibition of using the remote control) OFF: Permission of using the remote control
		02	OFF → ON: Permission of operation ON → OFF: Stop
		03	ON: Operation OFF: The system stops, then the applicable unit indicates "A0". The other indoor units indicate "U9".

Fan Speed Changeover When Thermostat is OFF

By setting to “Set Fan Speed,” you can switch the fan speed to the set fan speed when the heating thermostat is OFF.

∗ Since there is concern about draft if using “fan speed up when thermostat is OFF,” you should take the setup location into consideration.

Setting Table

Mode No.	First Code No.	Second Code No.	Setting
12(22)	3	01	LL Fan Speed
		02	Set Fan Speed

Auto Restart after Power Failure Reset

For the air conditioners with no setting for the function (same as factory setting), the units will be left in the stop condition when the power supply is reset automatically after power failure reset or the main power supply is turned on again after once turned off. However, for the air conditioners with the setting, the units may start automatically after power failure reset or the main power supply turned on again (return to the same operation condition as that of before power failure).

For the above reasons, when the unit is set enabling to utilize “Auto restart function after power failure reset”, utmost care should be paid for the occurrence of the following situation.

Caution

1. The air conditioner starts operation suddenly after power failure reset or the main power supply turned on again. Consequently, the user might be surprised (with question for the reason why).

2. In the service work, for example, turning off the main power switch during the unit is in operation, and turning on the switch again after the work is completed start the unit operation (the fan rotates).

Air Flow Adjustment - Ceiling height

Make the following setting according to the ceiling height. The setting position No. is set to “01” at the factory.

■ **In the Case of FXAQ, FXHQ**

Mode No.	Setting Switch No.	Setting Position No.	Setting
13(23)	0	01	Wall-mounted type: Standard
		02	Wall-mounted type: Slight increase
		03	Wall-mounted type: Normal increase

■ **In the Case of FXFQ25~80**

Mode No.	First code No.	Second code No.	Setting	Ceiling height		
				4-way Outlets	3-way Outlets	2-way Outlets
13 (23)	0	01	Standard (N)	Lower than 2.7 m	Lower than 3.0 m	Lower than 3.5 m
		02	High Ceiling (H)	Lower than 3.0 m	Lower than 3.3 m	Lower than 3.8 m
		03	Higher Ceiling (S)	Lower than 3.5 m	Lower than 3.5 m	—

■ **In the Case of FXFQ100~125**

Mode No.	First code No.	Second code No.	Setting	Ceiling height		
				4-way Outlets	3-way Outlets	2-way Outlets
13 (23)	0	01	Standard (N)	Lower than 3.2 m	Lower than 3.6 m	Lower than 4.2 m
		02	High Ceiling (H)	Lower than 3.6 m	Lower than 4.0 m	Lower than 4.2 m
		03	Higher Ceiling (S)	Lower than 4.2 m	Lower than 4.2 m	—

■ **In the Case of FXUQ71~125**

Mode No.	First code No.	Second code No.	Setting	Ceiling height		
				4-way Outlets	3-way Outlets	2-way Outlets
13 (23)	0	01	Standard (N)	Lower than 2.7 m	Lower than 3.0 m	Lower than 3.5 m
		02	High Ceiling (H)	Lower than 3.0 m	Lower than 3.5 m	Lower than 3.8 m
		03	Higher Ceiling (S)	Lower than 3.5 m	Lower than 3.8 m	—